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~~L. 143.~~

~~X. 206. a.~~

EB.9



ENCYCLOPÆDIA BRITANNICA.

A.

A,
Abbreviat.

A, THE first letter of the alphabet, in all the known languages of the world, that of Ethiopia excepted, in which it is the 13th. It has deservedly the first place in the alphabet, on account of its simplicity, very little more being necessary to its pronunciation than opening the mouth.

In the English language **A** is the mark of three different sounds, termed, by our grammarians, the *broad*, the *open*, and the *slender A*. The first resembles that of the German **A**, is found in several monosyllables, as *wall*, *salt*, &c. and is pronounced as *au* in *cause*. It is probable that the Saxons expressed only this broad sound of the letter, as it is still commonly retained in the northern districts of England, and universally throughout Scotland; as, *tauk* for *talk*, *wauk* for *walk* or *wake*.—The open **A** resembles that of the Italians in *adagio*, and is the same with that of *a* in *faiber*, *rather*, &c. The slender sound is peculiar to the English language, and resembles the sound of the French diphthong *ai* in *pais*, or their *a* masculine, or perhaps it is a middle sound between them. This is exemplified in *place*, *waste*, &c. also in *toleration*, *justification*, and all other words ending with *ation*.

A is sometimes added after words in burlesque poetry; in which case it only makes an additional syllable without any alteration of the sense, as the interjection **O** very often does in our ballads. It is also sometimes redundant, as in the words *arise*, *awake*, &c. which are not different in signification from *rise*, *wake*, &c.

It is sometimes a word, either noun or interjection; in which last case, it is commonly an expression of grief, and joined with the aspirate, as *ab!* When a noun, it is only with respect to itself; as *great A*, *little a*, &c.

A is very frequently used as an article; in which case it has no plural signification, and is used to denote the number *one*, as *a* house, *a* field, &c. When placed as an article before any of the vowels, *y* and *w* only excepted, it is joined with the letter *n*; as *an* island, *an* orator, &c.—In the three following cases it is a preposition: 1. When it goes before a participle, or noun derived from a participle; as, I am *a* doing this or that. 2. When used before local surnames; as *Cornelius a Lapide*, *Thomas a Kempis*, &c. 3. When it is used in composition; as, *a* foot, *a* sleep, &c. In some instances it denotes the proportion of one thing to another; as, so much *a* week, *a* man, *a* head, &c.

A, among the ancients, was a numeral letter, and

signified 500; and when a dash was added on the top, **A**, 5000.

A, in the Julian calendar, is the first of the seven DOMINICAL letters. It had been in use among the Romans long before the establishment of Christianity, as the first of the eight *nundinales literæ*; in imitation whereof it was that the dominical letters were first introduced.

A is also an abbreviation used with different intentions. Hence,

A, among logicians, is used to denote an universal affirmative proposition; according to the verse,

Afferat A, negat E, verum generaliter ambæ.

Thus, in the first figure, a syllogism consisting of three universal affirmative propositions, is said to be in *Bār-bā-rā*; the *A* thrice repeated, denoting so many of the propositions to be universal, &c. See **BARBARA**.

A, among the Romans, was used in giving votes or suffrages.—When a new law was proposed, each voter had two wooden ballots put into his hand; the one marked with a capital *A*, signifying *antiquo*, *q. d. antiquam volo*; and the other with *U. R.* for *uti rogas*. Such as were against the law, cast the first into the urn; signifying, I refuse it, I antiquate it; or, I like the ancient law, and desire no innovation.

A, in the trials of criminal causes, also denoted absolution: Whence Cicero, *pro Milone*, calls *A*, *litera salutaris*, a saving letter.—Three ballots were distributed to each judge, marked with the letters, *A* for *absolvo*, I acquit; *C* for *condemno*, I condemn; and *N. L.* for *non liquet*, It is not clear. From the number of each cast into the urn, the prætor pronounced the prisoner's fate. If they were equal in number, he was absolved.

A, in the ancient inscriptions of marbles, &c. occasionally stands for *Augustus*, *ager*, *aiunt*, &c. When double it denotes *Augusti*; when triple *aurum*, *argentum*, *æs*; and sometimes its meaning can only be known by the rest of the inscription. Isidore adds, that when it occurs after the word *miles*, (soldier), it denotes him young. On the reverse of ancient medals, it denotes that they were struck by the city of Argos, sometimes by that of Athens; but on coins of modern date, it is the mark of Paris.

A, as an abbreviation, is also often found in modern writers; as **A. D.** for *anno Domini*; **A. M.** *artium magister*, master of arts; *anno mundi*, &c.

A,
Abbreviat.

A
||
Aaron.

A, the letter a, with a line above it, thus \bar{a} , is used in medical prescriptions for *ana*, of each; sometimes it is written thus, $\bar{a}\bar{a}$: e. g. \mathcal{R} Mel. Sacchar. et Mann. \bar{a} , vel $\bar{a}\bar{a}$, \mathcal{Z} j. i. e. Take of honey, sugar, and manna, of each, one ounce.

A, put to bills of exchange, is in England an abbreviation of *accepted*, and in France for *accepté*. It is likewise usual among merchants to mark their sets of books with the letters A, B, C, &c. instead of the numbers 1, 2, 3, &c.

A.A.A. The chemical abbreviation for Amalgama, or Amalgamation.

AA, the name of several rivers in Germany and Switzerland.

AACH, a little town of Germany, in the circle of Sambia, near the source of the river Aach, and almost equally distant from the Danube and the lake Constance. It belongs to the house of Austria. E. Long. 9. o. N. Lat. 47. 55.

AAHUS, a little town of Germany, in the circle of Westphalia and bishopric of Munster. It is the capital of Aahus, a small district; has a good castle; and lies north-east of Coesfeldt. E. Long. 7. 1. N. Lat. 52. 10.

AAM, or HAAH , a liquid measure in common use among the Dutch, containing 128 measures called *mingles*, each weighing nearly 36 ounces avoirdupois; whence the *Aam* contains 288 English, and $148\frac{2}{3}$ pints Paris measure.

AAR, the name of two rivers, one in Switzerland, and another in Westphalia in Germany. It is also the name of a small island in the Baltic.

AARASSUS, in *Ancient Geography*, a town of Pisdia, in the Hither Asia, thought to be the Anasius of Ptolemy.

AARON, high-priest of the Jews, and brother to Moses, was by the father's side great grandson, and by the mother's, grandson of Levi. By God's command he met Moses at the foot of Mount Horeb, and they went together into Egypt to deliver the children of Israel: he had a great share in all that Moses did for their deliverance. The Scriptures call him the prophet of Moses, and he acted in that capacity after the Israelites had passed over the Red sea. He ascended Mount Sinai with two of his sons, Nadab and Abihu, and seventy elders of the people; but neither he nor they went higher than half way, from whence they saw the glory of God; only Moses and Joshua went to the top, where they staid forty days. During their absence, Aaron, overcome by the people's eager entreaties, set up the golden calf, which the Israelites worshipped by his consent. This calf has given rise to various conjectures. Some rabbies maintain that he did not make the golden calf, but only threw the gold into the fire, to get rid of the importunities of the people; and that certain magicians who mingled with the Israelites at their departure from Egypt, cast this gold into the figure of a calf. According to some authors, the fear of falling a sacrifice to the resentment of the people, by giving a refusal, made Aaron comply with their desire: and they allege also, that he hoped to elude their request, by demanding of the women to contribute their ear rings, imagining they would rather choose to remain without a visible deity, than be deprived of their personal ornaments. This affair of the golden calf happened in the third month after the Is-

raelites came out of Egypt. In the first month of the following year, Aaron was appointed by God high-priest; which office he executed during the time that the children of Israel continued in the wilderness. He died in the fortieth year after their departure from Egypt, upon Mount Hor, being then 123 years old; A. M. 2522, of the Julian period 3262, before the Christian era 1452.

AARON, the Carait, a learned Jew who flourished about the year 1299. He left many works on the Old Testament, among which there is one entitled, "A Commentary on the Pentateuch," which has been much valued. It was written in Hebrew, and printed in folio with a Latin translation, at Jena, in 1710.

AARON, another Carait Jew, who lived in the 15th century, wrote a concise Hebrew grammar, entitled *Chelil Yofhi*, "the Perfection of Beauty," which was printed at Constantinople in 1581.

AARON and JULIUS, *Saints*, were brothers who suffered martyrdom together, during the persecution under the emperor Dioclesian, in the year 303, about the same time with St Alban the first martyr of Britain. We are not told what their British names were, it being usual with the Christian Britons, at the time of baptism, to take new names from the Greek, Latin, or Hebrew. Nor have we any certainty as to the particulars of their death; only that they suffered the most cruel torments. Two churches were dedicated to the brothers, in which their bodies were interred, at Caerleon, the ancient metropolis of Wales.

AARON, or *Harun*, *Al Rafchid*, a celebrated caliph, or Mahometan sovereign of the Saracen empire; whose history is given under the article BAGDAD.

AARSENS, FRANCIS, Lord of Someldyck and Spycq, was one of the greatest ministers for negotiation the United Provinces could ever boast of. His father, Cornelius Aarfens, was register to the States; and being acquainted with Mr Plessis Mornay, at the court of William prince of Orange, he prevailed upon him to take his son under him, with whom he continued some years. John Olden Barneveldt, who presided over the affairs of Holland and all the United Provinces, sent him afterwards agent into France, where he learned to negotiate under those profound politicians Henry IV. Villeroy, Silleri, Rossie, Jaonin, &c. and he acquitted himself in such a manner as to obtain their approbation. Soon after, he was invested with the character of ambassador, and was the first who was recognized as such by the French court; at which time Henry IV. declared, that he should take precedence next to the Venetian minister. He resided in France 15 years; during which time he received great marks of esteem from the king, who created him a knight and baron; and for this reason he was received among the nobles of the province of Holland. However, he became at length so odious to the French court, that they desired to have him recalled. He was afterwards deputed to Venice, and to several German and Italian princes, upon occasion of the troubles in Bohemia. He was the first of three extraordinary ambassadors sent to England in 1620, and the second in 1641; in which latter embassy he was accompanied by the lord of Brederode as first ambassador, and Heemsvliet as third, to negotiate the marriage of Prince William, son of the prince of Orange, with a daughter

Aaron
||
Aarfens.

Aasar
||
Aba.Aba
||
Aback.

Daughter of Charles I. He was likewise ambassador extraordinary at the French court in 1624, at the beginning of Cardinal Richlieu's administration, who had a high opinion of him. The memoirs which he has left, of the negotiations in which he was engaged, show him to have been one of the ablest men of his time, and worthy of the confidence and trust reposed in him by his country. But his character is not altogether without stain. His enmity to the remonstrants was bitter and unrelenting; and he is supposed to have greatly encouraged the violent measures pursued by Prince Maurice against the venerable Barneveldt, and to have been the principal adviser for assembling the famous and persecuting synod of Dordrecht. He died at a very advanced age; and his son, who survived him, was reputed the wealthiest man in Holland.

AASAR, in *Ancient Geography*, a town of Palestine, in the tribe of Judah, situated between Azotus and Ascalon. In Jerome's time it was a hamlet.

AB, the eleventh month of the civil year of the Hebrews, and the fifth of their ecclesiastical year, which begins with the month Nisan. It answers to the moon of July; that is, to part of our month of the same name, and to the beginning of August: it consists of thirty days. The Jews fast on the first of this month, in memory of Aaron's death; and on the ninth, because on that day both the temple of Solomon, and that erected after the captivity, were burnt; the former by the Chaldeans, and the latter by the Romans. The same day is also remarkable among that people for the publication of Adrian's edict, wherein they were forbidden to continue in Judea, or even to look back when at a distance from Jerusalem, in order to lament the desolation of that city. The 18th of the same month is also a fast among the Jews; because the lamp in the sanctuary was that night extinguished, in the time of Ahaz.

AB, in the Syriac calendar, is the name of the last summer month. The first day of this month they call *Suum-Miriam*, the fast of the virgin, because the eastern Christians fasted from that day to the fifteenth, which was therefore called *Fatbr-Miriam*, the cessation of the fast of the virgin.

ABA (or rather ABAU) HANIFAH or HANFA, surnamed Al-Nooma, was the son of Thabet, and born at Coufah in the 80th year of the Hegira. This is the most celebrated doctor of the orthodox Mussulmans, and his sect is held in greatest esteem among the four which they indifferently follow. Notwithstanding this, he was not very well esteemed during his life; inasmuch that the caliph Almanfor caused him to be imprisoned at Bagdad, for having refused to subscribe to the opinion of absolute predestination, which the Mussulmans call Cadha. But afterwards Abou Joseph, who was the sovereign judge or chancellor of the empire under the caliph Hadi, brought his doctrine into such credit, that it became a prevailing opinion, That to be a good Mussulman was to be a Hanifite. He died in the 150th year of the Hegira, in the prison of Bagdad: and it was not till 335 years after his death, that Melick Schah, a sultan of the Selgiucidan race, erected to his memory a magnificent monument in the same city, and a college for his followers, in the 485th year of the Hegira, and Anno Christi 1092. The most

eminent successors of this doctor were Ahmed Benali, Al Giassas, and Al Razi who was the master of Nafari; and there is a mosque particularly appropriated to them in the temple of Mecca.

ABA, *Abas*, *Abos*, or *Abus*, in *Ancient Geography*, the name of a mountain of Greater Armenia, situated between the mountains Niphatos and Nibonis. According to Strabo, the Euphrates and Araxes rose from this mountain; the former running eastward, and the latter westward.

ABA. See ABÆ.

ABA, ALBON, or OVON, a king of Hungary. He married the sister of Stephen I. and was elected king on the deposition of Peter in 1041. The emperor Henry III. preparing to reinstate Peter on the throne, Aba made an incursion into his dominions, and returned loaded with booty; but was next year obliged to make restitution, by paying a large sum, in order to prevent a threatened invasion from the emperor. He indulged in great familiarity with the lower class of the people, on account of which, and his severity to their order, he became universally odious to the nobility. The fugitive nobles, aided by the emperor, excited a revolt against him. After a bloody battle, Aba was put to flight; and was murdered by his own soldiers in 1044, having reigned three years.

ABAA, a river in Thessaly, supposed by some to be the Peneus of the ancients.

ABACÆNA, in *Ancient Geography*, a town of Media, and another of Caria in the Hither Asia.

ABACÆNUM, in *Ancient Geography*, a town of Sicily, whose ruins are supposed to be those lying near Trippi, a citadel on a high and steep mountain not far from Messina. The inhabitants were called *Abacenini*.

ABACH, a market town of Germany, in Lower Bavaria, seated on the Danube, 12 miles S. W. of Ratibon. It is remarkable for Roman antiquities, and for springs of mineral waters which are said to be good for various distempers. E. Long. 11. 56. Lat. 48. 53.

ABACINARE, or ABBACINARE, in writers of the middle age, a cruel species of punishment, consisting in the blinding of the criminal, by holding a red-hot basin or bowl of metal before his eyes.

ABACK (a sea term), the situation of the sails when the surfaces are flatted against the masts by the force of the wind. The sails are said to be *taken aback* when they are brought into this situation, either by a sudden change of the wind, or by an alteration in the ship's course. They are *laid aback*, to effect an immediate retreat, without turning to the right or left; or, in the sea phrase, to give the ship *stern-way*, in order to avoid some danger discovered before her in a narrow channel, or when she has advanced beyond her station in the line of battle, or otherwise. The sails are placed in this position by slackening their lee braces, and hauling in the weather ones; so that the whole effort of the wind is exerted on the fore part of their surface, which readily pushes the ship astern, unless she is restrained by some counteracting force. It is also usual to spread some sail aback near the stern, as the mizen-top-sail, when a ship rides with a single anchor in a road, in order to prevent her from approaching it so as to entangle the flukes of it with her slackened cable, and thereby loosen it from the ground.

Abacot
|
Abacus

ABACOT, the name of an ancient cap of state worn by the kings of England, the upper part whereof was in the form of a double crown.

ABACTORS, or **ABACTORES**, a name given to those who drive away, or rather steal, cattle by herds, or great numbers at once; and are therefore very properly distinguished from *fures* or thieves.

ABACUS, among the ancients, was a kind of cup-board or buffet. Livy, describing the luxury into which the Romans degenerated after the conquest of Asia, says they had their *abaci*, beds, &c. plated over with gold.

ABACUS, among the ancient mathematicians, signified a table covered with dust, on which they drew their diagrams; and word in this sense being derived from the Phœnician *abak*, dust.

ABACUS, or **ABACISCIUS**, in *Architecture*, signifies the superior part or member of the capital of a column, and serves as a kind of crowning to both. Vitruvius tells us the abacus was originally intended to represent a square tile laid over an urn, or rather over a basket. See *ARCHITECTURE*, N^o 15.—The form of the abacus is not the same in all orders: In the Tuscan, Doric, and Ionic, it is generally square; but in the Corinthian and Composite, its four sides are arched inwards, and embellished in the middle with some ornament, as a rose or other flower. Scamozzi uses *abacus* for a concave moulding on the capital of the Tuscan pedestal; and Palladio calls the plinth above the echinus, or boudin, in the Tuscan and Doric orders, by the same name.

ABACUS is also the name of an ancient instrument for facilitating operations in arithmetic. It is variously contrived. That chiefly used in Europe is made by drawing any number of parallel lines at the distance of two diameters of one of the counters used in the calculation. A counter placed on the lowest line, signifies 1; on the 2d, 10; on the 3d, 100; on the 4th, 1000, &c. In the intermediate spaces, the same counters are estimated at one half of the value of the line immediately superior, viz. between the 1st and 2d, 5; between the 2d and 3d, 50, &c. See Plate I. fig. 1. where the same number, 1802 for example, is represented under both divisions by different dispositions of the counters. A farther illustration of this mode of notation is given in fig. 2.

National debt, according to Mr Addington, 1st Feb.

| | | |
|--------------------------|---|----------------|
| 1802, | - | L. 400,709,832 |
| According to Mr Tierney, | - | 457,154,081 |
| According to Mr Morgan, | - | 558,418,628 |
| New sinking fund, | - | 3,275,143 |
| Old sinking fund, | - | 2,534,187 |

ABACUS is also used by modern writers for a table of numbers ready cast up, to expedite the operations of arithmetic. In this sense we have *Abaci* of addition, of multiplication, of division. This instrument for computation is, under some variations, in use with most nations, as the Greeks, Romans, Germans, French, Chinese, &c.

Grecian Abacus, was an oblong frame, over which were stretched several brass wires, strung with little ivory balls, like the beads of a necklace; by the various arrangements of which all kinds of computations were easily made.

Roman Abacus was a little varied from the Gre-

cian, having pins sliding in grooves, instead of strings or wires and beads.

Chinese Abacus, or *SHWANPAN*, like the Grecian, consists of several series of beads strung on brass wires, stretched from the top to the bottom of the instrument, and divided in the middle by a cross piece from side to side. In the upper space every string has two beads, which are each counted for 5; and in the lower space every string has five beads, of different values, the first being counted as 1, the second as 10, the third as 100, and so on, as with us.

Abacus Pythagoricus, the common multiplication table, so called from its being invented by Pythagoras.

Abacus Logisticus, is a rectangled triangle, whose sides, forming the right angle, contain the numbers from 1 to 60; and its area, the facta of each two of the numbers perpendicularly opposite. This is also called a *canon of sexagesimals*.

Abacus et Palmule, in the *Ancient Music*, denote the machinery, whereby the strings of polypletra, or instruments of many strings, were struck with a plectrum made of quills.

Abacus Harmonicus, is used by Kircher for the structure and disposition of the keys of a musical instrument, whether to be touched with the hands or the feet.

Abacus Major, in *Metallurgic Operations*, the name of a trough used in the mines, wherein the ore is washed.

ABADDON, is the name which St John in the Revelation gives to the king of the locusts, the angel of the bottomless pit. The inspired writer says, this word is Hebrew, and in Greek signifies *ΑΒΑΔΩΝ*, i. e. a *destroyer*. That angel-king is thought to be Satan or the devil: but Mr le Clerc thinks with Dr Hammond, that by the locusts which came out of the abyss, may be understood the zealots and robbers, who miserably afflicted the land of Judea, and laid it in a manner waste, before Jerusalem was taken by the Romans; and that Abaddon, the king of the locusts, may be John of Gischala, who having treacherously left that town a little before it was surrendered to Titus, came to Jerusalem, where he soon headed part of the zealots, who acknowledged him as their king, whilst the rest would not submit to him. This subdivision of the zealot party brought a thousand calamities on the Jews.

ABADIR, a title which the Carthaginians gave to gods of the first order. In the Roman mythology, it is the name of a stone which Saturn swallowed, by the contrivance of his wife Ops, believing it to be his newborn son Jupiter: hence it became the object of religious worship.

ABÆ, or **ABA**, in *Ancient Geography*, a town of Phœcis in Greece, near Helicon; famous for an oracle of Apollo older than that at Delphi, and for a rich temple which was plundered and burnt by the Persians.

ABAFT, a sea term, signifying the hinder part of a ship, or all those parts both within and without which lie towards the stern, in opposition to **AFORK**; which see.—*Abast*, is also used as a preposition, and signifies *further aft*, or *nearer the stern*; as, the barricade stands *abast* the main-mast, i. e. behind it, or nearer the stern.

ABAISSED, *abaissé*, in *Heraldry*, an epithet applied to the wings of eagles, &c. when the tip looks downwards

Abacus
|
Abassid

Abaka
||
Abantias.

downwards to the point of the shield, or when the wings are shut; the natural way of bearing them being extended.

ABAKA KHAN, the eighth emperor of the Moguls, a wise and good prince, ascended the throne in 1264. He reigned 17 years, and is by some authors said to have been a Christian. It may be admitted, indeed, that he joined with the Christians in keeping the feast of Easter, in the city Hamadan, a short time before his death. But this is no proof of his Christianity; it being common, in times of brotherly love, for Christians and Mahometans to join in keeping the same feasts, when each would compliment the other with doing honour to his solemnity.

ABAKANSKOI, a town of Siberia, which was founded by Peter the Great in 1707. It is provided with a garrison, to protect the hunters who are employed in catching martens and foxes on account of their furs, which are here an important article of commerce. It is situated in E. Long. 94. 5. N. Lat. 53. 30.

ABALAK, a small town of Siberia, two miles from Tobolsk, in E. Long. 64. 10. N. Lat. 57. 1. Abalak is famous as the resort of many pilgrims who visit an image of the virgin Mary, which is annually carried in procession to Tobolsk.

ABALIENATION, in Law, the act of transferring one man's property to another.

ABALLABA, the ancient name of APPLEBY, a town in Westmorland, remarkable only for its antiquity, having been a Roman station. W. Long. 1. 4. N. Lat. 55. 38.

ABALUS, in *Ancient Geography*, supposed by the ancients to be an island in the German ocean, called by Timæus *Basilis*, and by Xenophon *Lampfacenus Baltia*; now the peninsula of Scandinavia. Here, according to Pliny, some imagined that amber dropped from the trees.

ABANA, or AMANA, in *Ancient Geography*, a river of Phœnicia, which, rising from Mount Hermon, washed the south and west sides of Damascus, and falls into the Phœnician sea to the north of Tripolis, called *Chrysorrheas*, by the Greeks.

ABANGA. See ADY.

ABANO, a town of the Paduano, in the republic of Venice, famous among the ancients for its hot baths.

ABANTES, a people who came originally from Thrace, and settled in Phocæa, a country of Greece, where they built a town which they called *Aba*, after the name of Abas their leader; and if we may credit some ancient authors, the Abantes went afterwards into the island Eubœa, now called *Negropont*: others say the Abantes of Eubœa came from Athens. The Abantes were a very warlike people, closing with their enemies, and fighting hand to hand.

ABANTIAS, or ABANTIS, in *Ancient Geography*, a name of the island Eubœa in the Egean sea, extending along the coast of Greece, from the promontory Sunium in Attica to Thessaly, and separated from Bœotia by a narrow strait called *Euripus*. From its length the island was formerly called *Macris*; afterwards *Abantias* or *Abantis*, from the Abantes, a people originally of Thrace, called by Homer *οπισθεν Κορωσιες*, from wearing their hair long behind, having in a battle experienced the inconvenience of wearing long hair be-

fore. From cutting their hair before, they were called *Curetes*.

ABAPTISTON, in *Surgery*, the perforating part of the instrument called a ΤΡΕΠΑΝ. This instrument, which is mentioned by Galen, Fabricius ab Aquapendente, and others, was a conical saw with a circular edge. Modern practitioners, however, prefer the cylindrical form; and various contrivances have been recommended to obviate the danger that may arise from want of dexterity, or from rashness, in performing the operation of trepanning. A new instrument has been lately invented and delineated for this purpose, by Mr Rodman, surgeon in Paisley. This instrument is so contrived, that it can be fitted to cut any thickness of bone without danger of injuring the brain; and as no pivot or centre-pin is necessary, the dreadful accidents which have sometimes happened by not removing it, when the instrument in common use is employed, are completely avoided. (*Philosoph. Mag. April 1802.*)

ABARA, a town in the Greater Armenia, under the dominion of the Turks: it is often the residence of the archbishop of Nakhivan. E. Long. 46. 25. N. Lat. 39. 45.

ABARANER, a town of Asia, in the Greater Armenia, belonging to the Turks: it is seated on the river Alingena. E. Long. 46. 30. N. Lat. 39. 50.

ABARCA, an ancient kind of shoe used in Spain for passing the mountains with. It was made of raw hides, and bound with cords, which secured the feet of travellers against the snow.

ABARIM, high mountains of steep ascent, separating the country of the Ammonites and Moabites from the land of Canaan, where Moses died. According to Josephus, they stood opposite to the territory of Jericho, and were the last station but one of the Israelites coming from Egypt. Nebo and Pisgah were parts of these mountains.

ABARIS, the Hyperborean; a celebrated sage of antiquity, whose history and travels have been the subject of much learned discussion. Such a number of fabulous stories* were told of him, that Herodotus himself seems to scruple to relate them. He tells us only †, that this barbarian was said to have travelled with an arrow, and to have taken no sustenance: but this does not acquaint us with the marvellous properties which were attributed to that arrow; nor that it had been given him by the Hyperborean Apollo. With regard to the occasion of his leaving his native country, Harpocration ‡ tells us, that the whole earth being infested with a deadly plague, Apollo, upon being consulted, gave no other answer, than that the Athenians should offer up prayers in behalf of all other nations; upon which, several countries deputed ambassadors to Athens, among whom was Abaris the Hyperborean. In this journey, he renewed the alliance between his countrymen and the inhabitants of the island of Delos. It appears that he also went to Lacedæmon; since, according to some writers ||, he there built a temple consecrated to Proserpine the Salutary. It is asserted, that he was capable of foretelling earthquakes, driving away plagues, laying storms §, &c. He wrote several books, as Suidas* informs us, viz. Apollo's arrival in the country of the Hyperboreans; The nuptials of the river Hebrus; Οιογενεια, or the Generation of the Gods; A collection of oracles, &c. Abaris.

† Lib. iv. cap. 36.

‡ Under the word Αεαγισω.

§ Pausanias, lib. iii. p. 94.

|| Porphyrus in *Vita Pythagor.*

* Under the word Αεαγισω.

† Under the word Αεαγισω.

‡ Under the word Αεαγισω.

§ Under the word Αεαγισω.

|| Under the word Αεαγισω.

¶ Under the word Αεαγισω.

⋄ Under the word Αεαγισω.

Himerius

De articulatione. Himerius the sophist applauds him for speaking pure Greek; which attainment will be no matter of wonder to such as consider the ancient intercourse there was between the Greeks and Hyperboreans.—If the Hebrides, or Western islands of Scotland, (says Mr Toland †), were the Hyperboreans of Diodorus †, then the celebrated Abaris was of that country; and likewise a druid, having been the priest of Apollo. Suidas, who knew not the distinction of the insular Hyperboreans, makes him a Scythian; as do some others, misled by the same vulgar error; though Diodorus has truly fixed his country in an island, and not on the continent. Indeed the fictions and mistakes concerning our Abaris are infinite: however, it is agreed by all that he travelled quite over Greece, and from thence into Italy, where he conversed familiarly with Pythagoras, who favoured him beyond all his disciples, by instructing him in his doctrines (especially his thoughts of nature) in a plainer and more compendious method than he did any other. This distinction could not but be very advantageous to Abaris. The Hyperborean, in return, presented the Samian, as though he equalled Apollo himself in wisdom, with the sacred arrow, on which the Greeks have fabulously related * that he sat astride, and flew upon it, through the air, over rivers and lakes, forests and mountains; in like manner as our vulgar still believe, particularly those of the Hebrides, that wizards and witches fly whithersoever they please on their broomsticks. The orator Himerius above mentioned, though one of those who, from the equivocal sense of the word *Hyperborean*, seem to have mistaken Abaris for a Scythian, yet describes his person accurately, and gives him a very noble character. “They relate (says he) that Abaris the sage was by nation a Hyperborean, appeared a Grecian in speech, and resembled a Scythian in his habit and appearance. He came to Athens, holding a bow in his hand, having a quiver hanging on his shoulders, his body wrapt up in a plaid, girt about the loins with a gilded belt, and wearing trowsers reaching from his waist downward.” By this it is evident (continues Mr Toland) that he was not habited like the Scythians, who were always covered with skins; but appeared in the native garb of an Aboriginal Scot. As to what relates to his abilities, Himerius informs us, that “he was affable and pleasant in conversation, in dispatching great affairs secret and industrious, quick-sighted in present exigencies, in preventing future dangers circumspect, a searcher after wisdom, desirous of friendship, trusting little to fortune, and having every thing trusted to him for his prudence.” Neither the Academy nor the Lycæum could have furnished a man with fitter qualities to travel so far abroad, and to such wise nations, about affairs no less arduous than important. And if we further attentively consider his moderation in eating, drinking, and the use of all those things which our natural appetites incessantly crave; joining the candour and simplicity of his manners with the solidity and wisdom of his answers; all which we find sufficiently attested; it must be owned that the world at that time had few to compare with Abaris.

† Account of the Druids, in his *Posthumous Works*, vol. i. p. 161.
† Diod. Sic. lib. ii. iii.

* Jamblichus *Vita Pythagoræ*, p. 128.

ABARTICULATION, in *Anatomy*, a species of articulation, admitting of a manifest motion; called al-

so *Diarthrofis*, and *Dearticulatio*, to distinguish it from that sort of articulation which admits of a very obscure motion, and is called *Synarthrofis*.

ABAS, a weight used in Persia for weighing pearls. It is one-eighth less than the European carat.

ABAS, in *Heathen Mythology*, was the son of Hypothon and Meganira, who entertained Ceres, and offered a sacrifice to that goddess; but Abas ridiculing the ceremony, and giving her opprobrious language, she sprinkled him with a certain mixture she held in her cup, on which he became a newt or water lizard.

ABAS, *Schah*, the Great, was third son of Codabendi, 7th king of Persia of the race of the Sophis. Succeeding to his father in 1585, at the age of 18, he found the affairs of Persia at a low ebb, occasioned by the conquests of the Turks and Tartars. He regained several of the provinces they had seized; but death put a stop to his victories in 1629, after a reign of 44 years. He was the greatest prince who had reigned in Persia for many ages; and it was he who made Isfahan the metropolis of Persia. His memory is held in the highest veneration among the Persians.

ABAS, *Schah*, his grandson, 9th king of Persia of the race of the Sophis, succeeded his father Sefi at 13 years of age. He was but 18 when he made himself master of the city Candahar, which had surrendered in his father's reign to the Great Mogul, and all the province about it; and he preserved it afterwards against this Indian emperor, though he besieged it more than once with an army of 300,000 men. He was a very merciful prince, and openly protected the Christians. He had formed a design of extending the limits of his kingdom toward the north, and had for that effect levied a powerful army; but death put a stop to all his great designs, at 37 years of age, A. D. 1666.

ABASCIA, or *ABCASSIA*, the northern district of the western division of Georgia in Asia, situated on the coast of the Black sea, and tributary to the Turks. The inhabitants are poor, thievish, and treacherous, so that there is no trading with them without the utmost caution. They trade in furs, buck and tyger skins, linen yarn, boxwood, and bees wax: but their principal traffic consists in the sale of their own children to the Turks, and to one another. They are destitute of many necessaries of life, and have nothing among them that can be called a town; though we find Anacopia, Dandar, and Czekorni, mentioned in the maps. They have the name of Christians; but have nothing left but the name, any more than the Mingrelians their northern neighbours. The men are robust and active, and the women are fair and beautiful; on which account the Turks have a great value for the female slaves which they purchase from among them. Their customs are much the same as those of the *MINGRELIANS*; which see. E. Long. from 39° to 43° N. Lat. from 43° to 45°.

ABASCUS, a river of Asiatic Sarmatia, which, rising from Mount Caucasus, falls into the Euxine, between Pityus to the east, and Nosis to the west.

ABASITIS, in *Ancient Geography*, a tract of Asiatic Myfia, in which was situated the city of Ancyra.

ABASSA, THE GREATER and THE SMALLER, two districts in the vicinity of the Caucasian mountains. The latter, according to Pallas, is inhabited by six tribes who were formerly Christians, but the nobles now profess

Abas
||
Abassa.

Abaff
|
Abatis.

fels the Mahometan religion. In manners, dress, mode of life, and, in some degree, in language, they resemble the Circassians. They practise agriculture, but chiefly depend on pasturage for their subsistence. They are celebrated for a fine breed of large horses. They are frequently harassed and plundered by the Circassian princes.

ABASSI, or ABASSIS, a silver coin current in Persia, equivalent in value to a French livre, or tenpence halfpenny sterling. It took its name from Schah Abbas II. king of Persia, under whom it was struck.

ABASSUS, in *Ancient Geography*, a town of the Greater Phrygia, on the confines of the Tolistobagii, a people of Galatia in Asia.

ABATAMENTUM, in *Law*, is an entry to lands by interposition, i. e. when a person dies seized, and another who has no right enters before the heir.

To ABATE, (from the French *abatre*, to pull down, overthrow, demolish, batter down, or destroy), a term used by the writers of the English common law both in an active and neutral sense; as, To *abate* a castle, is to beat it down. To *abate* a writ, is, by some exception, to defeat or overthrow it. A stranger *abateth*; that is, entereth upon a house or land void by the death of him that last possessed it, before the heir takes possession, and so keepeth him out: wherefore, as he that putteth out him in possession is said to disseize, so he that steppeth in between the former possessor and his heir is said to *abate*. In the neuter signification thus: The writ of the demandant shall *abate*; that is, shall be disabled, frustrated, or overthrown. The appeal *abateth* by covin; that is, the accusation is defeated by deceit.

ABATE, in the manege, implies the performing any downward motion properly. Thus a horse is said to *abate* or take down his curvets, when he puts both his hind legs to the ground at once, and observes the same exactness in all the times.

ABATELMENT, in *Commerce*, a term used for a prohibition of trade to all French merchants in the ports of the Levant who will not stand to their bargains, or refuse to pay their debts. It is a sentence of the French consul, which must be taken off before they can sue any person for the payment of their debts.

ABATEMENT, in *Heraldry*, an accidental figure supposed to have been added to coats of arms, in order to denote some dishonourable demeanour or stain, whereby the dignity of coat armour was rendered of less esteem. See *HERALDRY*.

ABATEMENT, in *Law*. See *To ABATE*.

ABATEMENT, in the *Customs*, an allowance made upon the duty of goods, when the quantum damaged is determined by the judgment of two merchants upon oath, and ascertained by a certificate from the surveyor and land waiter.

ABATIS, an ancient term for an officer of the stables.

ABATIS, or ABATTIS, in *Military Affairs*, a kind of retrenchment made of felled trees. In sudden emergencies, the trees are merely laid lengthwise beside each other, with the branches pointed outwards to prevent the approach of the enemy, while the trunks serve as a breastwork to the defendants. When the abatis is employed for the defence of a pass or entrance, the boughs of the trees are stripped of their leaves and

pointed, the trunks are planted in the ground, and the branches interwoven with each other.

ABATON, a building at Rhodes, erected as a fence to the trophy of Artemisia, queen of Halicarnassus, Coos, &c. raised in memory of her victory over the Rhodians; or rather to conceal the disgrace of the Rhodians from the eyes of the world: for to efface or destroy the trophy was with them a point of religion.

ABATOR, in *Law*, a term applied to a person who enters to a house or lands void by the death of the last possessor, before the true heir.

ABATOS, in *Ancient Geography*, an island in the lake Moeris, formerly famous for its papyrus. It was the burial place of Osiris.

ABAUZIT, FIRMIN, a learned Frenchman, was born at Ufez, in Languedoc, in November 1679. His father died when he was but two years of age. In consequence of the revocation of the edict of Nantz, in the time of Louis XIV. to avoid the rigours of persecution to which the Protestants of France were exposed, young Abauzit's mother, who was a Protestant, not without difficulty, escaped with her son to Geneva, where he remained secure from danger, and enjoyed the benefit of education. From his 10th to his 19th year, his time was wholly devoted to literature; and having made great progress in languages, he studied mathematics, physics, and theology. In the year 1698, he travelled into Holland, where he became acquainted with the learned Bayle, with Bafnage and Jurieu. Thence he passed over into England, and was introduced to Sir Isaac Newton, who entertained a very high opinion of his merit. For this philosopher afterwards sent him his *Commercium Epistolicum*, accompanied with a very honourable testimony. "You are well worth, says Newton, to judge between Leibnitz and me." The reputation of Abauzit reached the ears of King William, who encouraged him by a very handsome offer to settle in England; which he declined, and returned to Geneva. In 1715 he entered into the society formed for the purpose of translating the New Testament into the French language, and contributed valuable assistance to this work. The chair of philosophy in the university was offered to him by that body in 1723, which he refused on account of his health and diffidence of his talents. But in 1727 he accepted of the office of librarian to the city, the duties of which were neither burdensome, nor subjected him to any particular restraint.

Abauzit, who was deeply conversant in physical and mathematical knowledge, was one of the first who embraced the grand truths which the sublime discoveries of Newton exhibited to the world. He defended the doctrines of that philosopher against Father Castell; and discovered an error in the *Principia*, which was corrected by Newton in the second edition of his work. He was a perfect master of many languages; he understood history so exactly, that he remembered the names of the principal characters and the dates of the events; his knowledge of physics was deep and extensive, and he was well acquainted with medals and ancient manuscripts. The different sciences which he had studied, were so well digested and arranged in his retentive mind, that he could at once bring together all that he ever knew on any subject. A remarkable instance of this occurred in a conversation with

Abaton
|
Abauzit.

Abavo
||
Abba.

Rouffeau on the music of the ancients, while the latter was employed in compiling his Dictionary of Music. He had been at great pains in giving an accurate account of ancient music. But how much was he surpris'd to find that Abauzit could give him a full and clear history of all that he had with much labour collected; and the more so, when he was inform'd that 30 years had elapsed since his inquiries led him to consider that subject. It was probably in consequence of this incident that Rouffeau address'd to Abauzit one of the finest panegyrics which he ever wrote.

A very fine compliment is said to have been paid to Abauzit by Voltaire. A stranger having address'd the poet in a flattering manner, by saying he had come to Geneva to see a great man, Voltaire ask'd him, whether he had seen Abauzit?

This excellent man having enjoy'd that *otium cum dignitate*, so much talk'd of, and so eagerly sought after, but rarely obtained, having thus liv'd universally respect'd to the great age of 87 years, died in the year 1767, lamented by the republic, and regretted by the learned.

Abauzit was a sincere Christian; his piety was pure and unaffected; his benevolence was extensive. Liberal in his opinions, he was indulgent and forbearing to those whose sentiments and opinions were different from his own. Simple and easy in his manners, every thing about him, his house, his person, and his way of life, discover'd a strong aversion to show and luxury. He carefully avoid'd the officious observances of ceremony, and anxiously withdrew from the fulsome praise of flattery. His conversation, free from pedantry and ostentation, instructive and entertaining, was always heard with eagerness, and listned to with attention.

The writings which Abauzit left behind him are chiefly on religious subjects. He wrote an "Essay on the Apocalypse," in which he endeavour'd to show, that the predictions in that book were to be apply'd to the destruction of Jerusalem. This work was translated into English; to which a refutation was added, which satisfi'd Abauzit so much that he was mistaken in his views, that he order'd an edition then ready for publication in Holland to be stopp'd. His other works are, "Reflections on the Eucharist; On Idolatry; On the Mysteries of Religion; Paraphrases and Explanations of sundry parts of Scripture; Several Critical and Antiquarian Pieces; and various Letters."

ABAVO, in *Botany*, a synonyme of the ADANSONIA.

ABB, a term among clothiers apply'd to the yarn of a weaver's warp. They say also *Abb-wool* in the same sense.

ABBA, in *Ancient Geography*, a town of Africa Propria, near Carthage.

ABBA, in the Syriac and Chaldee languages, literally signifies *a father*; and figuratively, a superior, reputed as a father in respect of age, dignity, or affection. It is more particularly us'd in the Syriac, Coptic, and Ethiopic churches, as a title given to the bishops. The bishops themselves bestow the title *Abba* more eminently on the bishop of Alexandria; which occasioned the people to give him the title of *Baba*, or *Papa*, that is *Grandfather*; a title which he bore before the bishop of Rome. It is a Jewish title of honour given to certain rabbins call'd *Tanaites*: and it is also particularly us'd, by some writers of the middle

age, for the superior of a monastery, usually call'd ABBOT.

Abbadie
||
Abbassides.

ABBADIE, JAMES, an eminent Protestant divine, born at Nay in Bern in 1654; first educated there under the famous John la Placette, and afterwards at the university of Sedan. From thence he went into Holland and Germany, and was minister in the French church of Berlin. He left that place in 1690; came into England; was some time minister in the French church in the Savoy, London; and was made dean of Killalo in Ireland. He was strongly attach'd to the cause of King William, as appears in his elaborate defence of the Revolution, and his history of the assassination-plot. He had great natural abilities, which he improv'd by true and useful learning. He was a most zealous defender of the primitive doctrine of the Protestants, as appears by his writings; and that strong nervous eloquence for which he was so remarkable, enabled him to enforce the doctrines of his profession from the pulpit with great spirit and energy. He possess'd uncommon powers of memory. It is said that he compos'd his works without committing any part to writing, till they were wanted for the press. He died in London in 1727, after his return from a tour in Holland. He published several works in French that were much esteem'd; the principal of which are, *A Treatise on the Truth of the Christian religion; The Art of Knowing one's Self; A Defence of the British Nation; the Deity of Jesus Christ essential to the Christian Religion; The History of the last Conspiracy in England, written by order of King William III.; and The Triumph of Providence and Religion, or the opening the Seven Seals by the Son of God.*

ABBAS, son of Abdalmotalleb, and Mahomet's uncle, oppos'd his nephew with all his power, regarding him as an impostor and traitor to his country; but in the second year of the Hegira, being overcome and made a prisoner at the battle of Beder in 623, a great ransom being demand'd for him, he represent'd to Mahomet, that his paying it would reduce him to beggary, which would bring dishonour on the family. Mahomet, who knew that he had conceal'd large sums of money, said to him, "Where are the purses of gold that you gave your mother to keep when you left Mecca? Abbas, who thought this transaction secret, was much surpris'd, and conceiving that his nephew was really a prophet, embrac'd his religion. He became one of his principal captains; and sav'd his life when in imminent danger at the battle of Honain, against the Thakeftes, soon after the reduction of Mecca. But besides being a great commander, Abbas was one of the first doctors of Islamism, the whole of whose science consist'd in being able to repeat and explain the Koran, and to preserve in their memory certain apocryphal histories. He is said to have read lectures on every chapter of the Koran, as his nephew pretended to receive them from heaven. He died in 652, and his memory is held in the highest veneration among the Mussulmans to this day.

Abul-Abbas, surnam'd *Safab*, one of his grandsons, was proclaim'd caliph a century after his death; and in him began the dynasty of the

ABBASSIDES, who possess'd the caliphate for 524 years. There were 37 caliphs of this race who succeeded one another without interruption.

ABBE',

Abbé

Abbey.

ABBE', in a monastic sense, the same with ABBOT.

ABBE', in a modern sense, the denomination of a class of persons which has been popular in France. They were not in orders; but having received the ceremony of tonsure, were entitled to enjoy certain privileges in the church. The dress of abbés was that of academics or professed scholars. In colleges they were the instructors of youth, and were employed as tutors in private families. Many of them have risen to a distinguished rank in the state, while others have been no less eminent in science and literature.

ABBESS, the superior of an abbey or convent of nuns. The abbess has the same rights and authority over her nuns that the abbots regular have over their monks. The sex indeed does not allow her to perform the spiritual functions annexed to the priesthood, with which the abbot is usually invested; but there are instances of some abbesses who have a right, or rather a privilege, to commission a priest to act for them. They have even a kind of episcopal jurisdiction, as well as some abbots who are exempted from the visitation of their diocessans.

Martene, in his treatise on the rights of the church, observes, that some abbesses have formerly confessed their nuns. But he adds, that their excessive curiosity carried them such lengths, that there arose a necessity of checking it. However, St Basil, in his Rule, allows the abbess to be present with the priest at the confession of her nuns.

ABBEVILLE, a considerable city of France in Picardy, and the capital of Ponthieu. The river Somme divides it into two parts. It has a collegiate church and twelve parish churches, the most considerable of which are St George's and St Giles's; besides a great number of monasteries and nunneries, a bailiwick, and a presidial court. It is a fortified town; the walls are flanked with bastions, and surrounded by large ditches. It was never taken; from which circumstance it is sometimes called the *Maiden Town*; and hence too its motto, *Semper fidelis*. The number of the inhabitants amounts to 36,000. The situation in the midst of a fertile valley is pleasant and healthy. It is famous for its woollen manufactory established in 1665 under the auspices of Colbert. The stuffs manufactured here are said to equal in fabric and quality the finest in Europe. There is also a manufactory of fire arms, and a considerable trade in grain, lint, and hemp. It is about fifteen miles east of the British channel, and ships may come from thence by the river Somme to the middle of the town. E. Long. 2. 6. N. Lat. 50. 7.

ABBEY, a monastery, or religious house, governed by a superior under the title of *abbot* or *abbess*.

Abbeys differ only from *priories*, that the former are under the direction of an abbot, and the others of a prior; for abbot and prior (we mean a prior conventual) are much the same thing, differing in little but the name.

Fauchet observes, that, in the early days of the French monarchy, dukes and counts were called *abbots*, and duchies and counties *abbeys*. Even some of their kings are mentioned in history under the title of *abbots*. Philip I. Louis VI. and afterwards the dukes of Orleans, are called *abbots of the monastery of St Aignan*. The dukes of Aquitaine were called *abbots of the monastery of St Hilary at Poitiers*; and the earls of Anjou, of *St Aubin*, &c.

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Abbey.

Monasteries were at first established as religious houses, to which persons retired from the bustle of the world to spend their time in solitude and devotion. But they soon degenerated from their original institution, and obtained large privileges, exemptions, and riches. They prevailed greatly in Britain before the Reformation, particularly in England; and as they increased in riches, so the state became poor: for the lands which these regulars possessed were *in mortua manu*, i. e. could never revert to the lords who gave them. This inconvenience gave rise to the statutes against gifts *in mortmain*, which prohibited donations to these religious houses; and Lord Coke tells us, that several lords, at their creation, had a clause in their grant, that the donor might give or sell his land to whom he would, (*exceptis viris religiosis et Judæis*) excepting monks and Jews.

These places were wholly abolished in England at the time of the Reformation; Henry VIII. having first appointed visitors to inquire into the lives of the monks and nuns, which were found in some places to be extremely irregular, the abbots, perceiving their dissolution unavoidable, were induced to resign their houses to the king, who by that means became invested with the abbey lands: these were afterwards granted to different persons, whose descendants enjoy them at this day: they were then valued at 2,853,000*l. per annum*, an immense sum in those days.

Though the suppression of religious houses, even considered in a political light only, was a great national benefit, it must be owned, that, at the time they flourished, they were not entirely useless. Abbeys or monasteries were then the repositories, as well as the seminaries, of learning; many valuable books and national records, as well as private history, having been preserved in their libraries, the only places in which they could have been safely lodged in those turbulent times. Many of those, which had escaped the ravages of the Danes, were destroyed with more than Gothic barbarity at the dissolution of the abbeys. These ravages are pathetically lamented by John Bale, in his declaration upon Leland's Journal 1549. "Covetousness," says he, "was at that time so busy about private commodity, that public wealth, in that most necessary and of respect, was not anywhere regarded. A number of them which purchased these superstitious mansions, reserved of the library books, some to seize their jakes, some to scour the candlesticks, and some to rub their boots; some they sold to the grocer and soapfeller; and some they sent over sea to the bookbinders, not in small numbers, but in whole ships full; yea, the universities of this realm are not clear of so detestable a fact. I know a merchant that bought the contents of two noble libraries for 40*s.* price; a shame it is to be spoken! This stuff hath he occupied instead of gray paper, by the space of more than these ten years, and yet he hath store enough for as many years to come. I shall judge this to be true, and utter it with heaviness, that neither the Britons under the Romans and Saxons, nor yet the English people under the Danes and Normans, had ever such damage of their learned monuments as we have seen in our time."

In these days every abbey had at least one person whose office it was to instruct youth; and the historians of this country are chiefly beholden to the monks

B

for

Abbey-
boyle
Abbot.

for the knowledge they have of former national events. In these houses also the arts of painting, architecture, and printing, were cultivated. They were hospitals for the sick and poor, and afforded entertainment to travellers at a time when there were no inns. In them the nobility and gentry who were heirs to their founders could provide for a certain number of ancient and faithful servants, by procuring them corodies, or stated allowances of meal, drink, and clothes. They were likewise an asylum for aged and indigent persons of good family. The neighbouring places were also greatly benefited by the fairs procured for them, and by their exemption from forest laws; add to which, that the monastic estates were generally let at very easy rents, the fines given at renewals included.

ABBEY BOYLE, a town of Ireland, in the county of Roscommon, and province of Connaught. W. Long. 8. 32. N. Lat. 56. 54. It is remarkable for an old abbey.

ABBEYHOLM, a town in Cumberland, so called from an abbey built there by David king of Scots. It stands on an arm of the sea. W. Long. 2. 38. N. Lat. 54. 45.

ABBOT, or ABBAT, the superior of a monastery of monks erected into an abbey or priory.

The name *Abbot* is originally Hebrew, where it signifies father. The Jews call *father*, in their language, *Ab*; whence the Chaldeans and Syrians formed *Abba*; thence the Greeks *Abbas*, which the Latins retained; and hence our *Abbot*, the French *Abbé*, &c. St Mark and St Paul use the Syriac *Abba* in their Greek, by reason it was then commonly known in the synagogues and the primitive assemblies of the Christians; adding to it, by way of interpretation, the word *father*, *Abba* ὁ πατήρ, "Abba, father;" *q. d.* Abba, that is to say, Father. But the name *Ab*, or *Abba*, which at first was a term of tenderness and affection in the Hebrew and Chaldee, became at length a title of dignity and honour: The Jewish doctors affected it; and one of their most ancient books, containing the sayings or apophthegms of divers of them, is entitled *Pirke Abbab* or *Avoth*; i. e. Chapters of the Fathers. It was in allusion to this affection, that Jesus Christ forbade his disciples to call any man their father on earth; which word St Jerome turns against the superiors of the monasteries of his time, for assuming the title of *Abbats*, or Fathers.

The name *Abbot*, then, appears as old as the institution of monks itself. The governors of the primitive monasteries assumed indifferently the titles *Abbots*, and *Archimandrites* *. They were really distinguished from the clergy; though frequently confounded with them, because a degree above laymen.

In those early days, the abbots were subject to the bishops and the ordinary pastors. Their monasteries being remote from cities, built in the farthest solitudes, they had no share in ecclesiastical affairs. They went on Sundays to the parish church with the rest of the people; or, if they were too remote, a priest was sent them to administer the sacraments; till at length they were allowed to have priests of their own body. The abbot or archimandrite himself was usually the priest: but his function extended no farther than to the spiritual assistance of his monastery; and he remained still in obedience to the bishop. There being among the

abbots several persons of learning, they made a vigorous opposition to the rising heresies of those times; which first occasioned the bishops to call them out of their deserts, and fix them about the suburbs of cities, and at length in the cities themselves; from which era their degeneracy is to be dated. Then the abbots threw off their former plainness and simplicity, assumed the rank of prelates, aspired at being independent of the bishops, and grasped at so much power, that several laws were made against them at the council of Chalcedon. Many of them, however, carried the point of independency, obtained the appellation of *lord*, and were distinguished by other badges of the episcopate, particularly the mitre.

Hence arose new distinctions between the abbots. Those were termed *mitred* abbots, who were privileged to wear the mitre, and exercise episcopal authority within their respective precincts, being exempted from the jurisdiction of the bishop. Others were called *croziered* abbots, from their bearing the crozier or pastoral staff. Others were styled *ecumenical* or universal abbots, in imitation of the patriarch of Constantinople; while others were termed *cardinal* abbots, from their superiority over all other abbots. In Britain, the mitred abbots were lords of parliament; and called abbots-fovereign, and abbots-general, to distinguish them from the other abbots. And as there were lords-abbots, so there were also lords-priors, who had exempt jurisdiction, and were likewise lords of parliament. Some reckon 26 of these lords abbots and priors who sat in parliament. Sir Edward Coke says, that there were 27 parliamentary abbots and two priors. In the parliament 20 Rich. II. there were but 25 abbots and two priors: but in the summons to parliament anno 4 Ed. III. more are named.

In Roman Catholic countries, the principal distinctions observed between abbots are those of *regular* and *commendatory*. The former take the vow and wear the habit of their order; whereas the latter are seculars who have received tonsure, but are obliged by their bulls to take orders when of proper age.

Anciently the ceremony of creating an abbot consisted in clothing him with the habit called *culcullus*, or cowl; putting the pastoral staff into his hand, and the shoes called *pedales* on his feet: but at present, it is only a simple benediction, improperly called, by some, consecration.

Abbot is also a title given to others besides the superiors of monasteries: thus bishops whose sees were formerly abbeys, are called abbots. Among the Genoese, the chief magistrate of the republic formerly bore the title of *abbot* of the people. It was likewise usual, about the time of Charlemagne, for several lords to assume the title of *count-abbots*, *abba-comites*; because the superintendency of certain abbeys was committed to them.

Abbot, George, archbishop of Canterbury, was born October 29. 1562, at Guildford in Surrey. He was the son of Maurice Abbot a cloth-worker. He studied at Oxford, and in 1597 was chosen principal of University college. In 1599, he was installed dean of Winchester: the year following, he was chosen vice-chancellor of the university of Oxford, and a second time in 1603. In 1604, the translation of the Bible now in use was begun by the direction of King James; and

Abbot.

* See *Monks* and *Archimandrite*.

Abbot. and Dr Abbot was the second of eight divines of Oxford, to whom the care of translating the whole New Testament (excepting the Epistles) was committed. The year following, he was a third time vice-chancellor. In 1608, he went to Scotland with George Hume earl of Dunbar, to assist in establishing an union between the churches of Scotland and England; and in this business he conducted himself with so much address and prudence, that it laid the foundation of all his future preferment. King James ever after paid great deference to his advice and counsel; and upon the death of Dr Overton bishop of Litchfield and Coventry, he named Dr Abbot for his successor, who was accordingly constituted bishop of those two united sees in December 1609. About a month afterwards he was translated to the see of London, and on the second of November following was raised to the archiepiscopal see.

It is not however improbable, that his extravagant adulation of his royal master, in which he went as far as any other court-chaplain could do, contributed not a little to his rapid preferment. In the preface to a pamphlet which he published, the following specimen of ridiculous flattery occurs: Speaking of the king, he says, "whose life hath been so immaculate and unspotted, &c. that even malice itself, which leaves nothing unsearched, could never find true blemish in it, nor cast probable aspersion on it.—Zealous as a David; learned and wise, the *Solomon* of our age; religious as *Josias*; careful of spreading Christ's faith as Constantine the Great; just as *Moses*; undefiled in all his ways as a *Jehoshaphat* and *Hezekiah*; full of clemency as another *Theodosius*."—If Mr Walpole had seen this passage, he certainly would not have said, that "honest Abbot could not flatter."

His great zeal for the Protestant religion made him a strenuous promoter of the match between the Elector Palatine and the Princess Elizabeth; which was accordingly concluded and solemnized the 14th of February 1612, the archbishop performing the ceremony on a stage erected in the royal chapel. In the following year happened the famous case of divorce between the lady Frances Howard, daughter of the earl of Suffolk, and Robert earl of Essex; which has been considered as one of the greatest blemishes of King James's reign. The part which the archbishop took in the business, added much to the reputation he had already acquired for incorruptible integrity. It was referred by the king to a court of delegates, whose opinion the king and court wished and expected to be favourable to the divorce. But the archbishop, unawed by royal authority, with inflexible firmness resisted it, and published his reasons for persisting in his opinion, to which the king, disappointed in his views, thought fit to reply: Sentence was given in the lady's favour. In 1618, the king published a declaration, which he ordered to be read in all churches, permitting sports and pastimes on the Lord's day: this gave great uneasiness to the archbishop; who, happening to be at Croydon on the day it was ordered to be read, had the courage to forbid it.

Being now in a declining state of health, the archbishop used in the summer to go to Hampshire for the sake of recreation; and being invited by Lord Zouch to hunt in his park at Bramzill, he met there with the

greatest misfortune that ever befel him; for he accidentally killed the game-keeper by an arrow from a cross-bow which he shot at one of the deer. This fatal accident threw him into a deep melancholy; and he ever afterwards kept a monthly fast on Tuesday, the day on which it happened; and he settled an annuity of 20l. on the widow*. Advantage was taken* of this misfortune, to lessen him in the king's favour; but his majesty said, "An angel might have miscarried in this sort." His enemies alledging that he had incurred an irregularity, and was thereby incapacitated for performing the offices of a primate; the king directed a commission to ten persons to inquire into this matter.

The result, however, was not satisfactory to his Grace's enemies; it being declared, that, as the murder was involuntary, he had not forfeited his archiepiscopal character. The archbishop after this seldom assisted at the council, being chiefly hindered by his infirmities; but in the king's last illness he was sent for, and constantly attended till his Majesty expired on the 27th of March 1625. He performed the ceremony of the coronation of King Charles I. though very infirm and distressed with the gout. He was never greatly in this king's favour; and the duke of Buckingham being his declared enemy, watched an opportunity of making him feel the weight of his displeasure. This he at last accomplished, upon the archbishop's refusing to license a sermon, preached by Dr Sibthorpe to justify a loan which the king had demanded, and pregnant with principles which tended to overthrow the constitution. The archbishop was immediately after suspended from all his functions as primate; and they were exercised by certain bishops commissioned by the king, of whom Laud, the archbishop's enemy, and afterwards his successor, was one: while the only cause assigned for this procedure was, That the archbishop could not at that time personally attend those services which were otherwise proper for his cognizance and direction. He did not, however, remain long in this situation; for a parliament being absolutely necessary, his Grace was sent for, and restored to his authority and jurisdiction. But not proving friendly to certain rigorous measures adopted by the prevailing church party, headed by Laud, whose power and interest at court were now very considerable, his presence became unwelcome there; so that, upon the birth of the prince of Wales, afterwards Charles II. Laud had the honour to baptize him, as dean of the chapel. The archbishop being worn out with cares and infirmities, died at Croydon, the 5th of August 1633, aged 71 years; and was buried at Guildford, the place of his nativity, where he had endowed an hospital with lands to the amount of 300l. *per annum*. A stately monument was erected over the grave, with his effigy in his robes.

He proved himself, in most circumstances of his life, to be a man of great moderation to all parties; and was desirous that the clergy should gain the respect of the laity by the sanctity and purity of their manners, rather than claim it as due to their function. His opinions and principles, however, have drawn upon him many severe reflections; particularly, from the earl of Clarendon. But Dr Welwood has done more justice to his merit and abilities †. He wrote several tracts 8vo, 1700,

Abbrevia-
tion.

ÆD. Q. II. VIR. Ædilis quinquennalis duum-vir.
 ÆL. Ælius, Ælia.
 ÆM. *vel* AIM. Æmilius, Æmilia.
 A. K. Ante kalendas.
 A. G. Animo grato : Aulus Gellius.
 AG. Ager, *vel* Agrippa.
 ALA. I. Ala prima.
 A. MILL. XXXV. A milliari triginta quinque, *vel*
 ad milliaria triginta quinque.
 A. M. XX. Ad milliare vigesimum.
 AN. A. V. C. Anno ab urbe conditâ.
 AN. C. H. S. Anno cent. hic fitus est.
 AN. DCLX. Anno sexcentesimo sexagesimo.
 AN. II. S. Annos duos semis.
 AN. IVL. Annos quadraginta sex.
 AN. N. Annos natus.
 ANN. LIII. H. S. E. Annorum quinquagesim. trium
 hic fitus est.
 ANN. NAT. LXVI. Annos natus sexaginta sex.
 ANN. PL. M. X. Annos *vel* annis plus minus decem.
 AN. O. XVI. Anno defunctus decimo sexto.
 AN. V. XX. Annos vixit viginti.
 AN. P. M. Annorum plus minus.
 A. XII. Annis duodecim.
 AN. P. M. L. Annorum plus minus quinquaginta.
 A. XX. H. EST. Annorum viginti hic est.
 AN. P. R. C. Anno post Romam conditam.
 AN. V. P. M. II. Annis vixit plus minus duobus.
 AN. XXV. STIP. VIII. Annorum viginti quinque
 stipendii, *vel* stipendiorum octo.
 A. P. M. Amico posuit monumentum.
 AP. Appia, Appius.
 A. P. V. C. Annorum post urbem conditam.
 APVD. L. V. CONV. Apud lapidem quintum con-
 venerunt.
 A. RET. P. III. S. Ante retro pedes tres semis.
 AR. P. Aram posuit.
 ARG. P. X. Argenti pondo decem.
 ARR. Arrius.
 A. V. B. A viro bono.
 A. V. C. Ab urbe conditâ.

B.

B. Balbus, Bulbius, Brutus, Belenus, Burrus.
 B. Beneficiario, beneficium, bonus.
 B. Balnea, beatus, bustum.
 B. *pro* V, berna *pro* verna, bixit *pro* vixit, bibo *pro* vi-
 vo, bictor *pro* victor, bidua *pro* vidua.
 B. A. Bixit annis, bonus ager, bonus amabilis, bona
 aurea, bonum aureum, bonis auguriis, bonis auspiciis.
 B. B. Bona bona, bene bene.
 B. DD. Bonis deabus.
 B. F. Bona fide, bona femina, bona fortuna, bene fac-
 tum.
 B. F. *reversed thus*, B. F. Bona femina, bona filia.
 B. H. Bona hereditaria, bonorum hæreditas.
 B. I. I. Boni iudicis iudicium.
 B. L. Bona lex.
 B. M. P. Bene merito posuit.
 B. M. P. C. Bene merito ponendum curavit.
 B. M. S. C. Bene merito sepulcrum condidit.
 BN. EM. Bonorum emptores.
 BN. H. I. Bona hic invenies.
 B. RP. N. Bono reipublicæ natus.
 B. A. Bixit, *id est*, vixit annis.

Abbrevia-
tion.

BIGINTI. Viginti.
 BIXIT. BIXSIT. BISSIT. Vixit.
 BIX. ANN. XXCI. M. IV. D. VII. Vixit annis oc-
 toginta unum, mensibus quatuor, diebus septem.
 BX. ANVS. VII. ME. VI. DI. XVII. Vixit annos
 septem, menses sex, dies septem decim.

C

C. Cæsar, Caio, Caius, cenfor, civitas, consul, condem-
 no.
 C. C. Carissimæ conjugii, calumnia causa, consilium
 cepit.
 C. C. F. Caius Cæii filius.
 C. B. Commune bonum.
 C. D. Comitialibus diebus.
 C. H. Custos hortorum *vel* hæredum.
 C. I. C. Caius Julius Cæsar.
 CC. VV. Clarissimi viri.
 CEN. Cenfor, centuria, centurio.
 CERTA. QUINQ. ROM. CO. Certamen quinquert-
 nale Romæ conditum.
 CL. Claudius.
 CL. V. Clarissimus vir.
 CH. COH. Cohors.
 C. M. *vel* CA. M. Causa mortis.
 CN. Cneus.
 C. O. Civitas omnis.
 COH. I. *vel* II. Cohors prima *vel* secunda.
 COS. ITER. ET TERT. DESIG. Consul iterum et
 tertium designatus.
 COS. TER. *vel* QUAR. Consul tertium, *vel* quartum.
 COSS. Consoles.
 COST. CUM. LOC. H-S. ∞ D. Custodiam cum loco
 festertis mille quingentis.
 C. R. Civis Romanus.
 CS. IP. Cæsar imperator.
 C. V. Centum viri.

D

D. Decius, decimus, decuria, decurio, dedicavit, dedit,
 devotus, dies, divus, Deus, dii, Dominus, domus,
 donum, datum, decretum, &c.
 D. A. Divus Augustus.
 D. B. I. Diis bene juvantibus.
 D. B. S. De bonis suis.
 DCT. Detrahitum.
 DDVIT. Dedicavit.
 D. D. Donum dedit, datis, datio, Deus dedit.
 D. D. D. Dono dederunt, *vel* datum decreto decurio-
 nem.
 D. D. D. D. Dignum Deo dcnum dedicavit.
 DDPP. Depositi.
 D. N. Dominus noster. D. D. N. N. Domini nostri.
 D. D. Q. O. H. L. S. E. V. Diis deabusque omnibus
 hunc locum sacrum esse voluit.
 DIG. M. Dignus memoriâ.
 D. M. S. Diis manibus sacrum.
 D. O. M. Deo optimo maximo.
 D. O. Æ. Deo optimo æterno.
 D. PP. Deo perpetuo.
 DR. Drusus.
 DR. P. Dare promittit.
 D. RM. De Romanis.
 D. RP. De republica.
 D. S. P. F. C. De sua pecunia faciendum curavit.
 DT. Duntaxat.
 DVL. *vel* DOL. Dulcissimus.

DEC. *

Abbrevia-
tion.

DEC.* XIII. AVG. XII. POP. XI. Decurionibus denariis tredecim, augustalibus duodecim, populo undecim.
D. IIII. ID. Die quartâ idus.
D. VIII. Diebus novem.
D. V. ID. Die quintâ idus.

E

E. Ejus, ergo, esse, est, erexit, exactum, &c.
E. C. F. Ejus causa fecit.
E. D. Ejus domus.
ED. Edictum.
E. E. Ex edicto.
EE. N. P. Esse non potest.
EG. Egit, egregius.
E. H. Ejus hæres.
EID. Idus.
EIM. Ejusmodi.
E. L. Ea lege.
E. M. Elexit *vel* erexit monumentum.
EQ. M. Equitum magister.
EQ. O. Equester ordo.
EX. A. D. K. Ex antè diem kalendas.
EX. A. D. V. K. DEC. AD. PRID. K. IAN. Ex antè diem quinto kalendas Decembris ad pridie kalendas Januariæ.
EX. H-S. X. P. F. I. Ex sestertiis decem parvis fieri jussit.
EX. H-S. CION. Ex sestertiis mille nummum.
EX. H-S. ∞ ∞ ∞ ∞ Ex sestertius quatuor millia.
EX. H-S. N. CC. L. ∞ D. XL. Ex sestertiis nummorum ducentis quinquaginta millibus, quingentis quadraginta.
EX. H-S. DC. ∞ D. XX. Ex sestertiis sexcentis millibus quingentis viginti.
EX. KAL. IAN. AD. KAL. IAN. Ex kalendis Januarii ad kalendas Januarii.

F

F. Fabius, fecit, factum, faciendum, familia, famula, fastus, Februarius, feliciter, felix, fides, fieri, fit, femina, filia, filius, frater, finis, flamen, forum, fluvius, faustum, fuit.
F. A. Filio amantissimo *vel* filie amantissimæ.
F. AN. X. F. C. Filio *vel* filie annorum decem faciendum curavit.
F. C. Fieri *vel* faciendum curavit, fidei commissum.
F. D. Flamen Dialis, filius dedit, factum dedicavit.
F. D. Fide jussor, fundum.
FEA. Femina.
FE. C. FERMÈ centum.
FF. Fabrè factum, filius familias, fratris filius.
F. F. F. Ferro, flamma, fame, fortior, fortuna, fato.
FF. Fecerunt.
FL. F. Flavii filius.
F. FQ. Filiis filiabusque.
FIX. ANN. XXXIX. M. I. D. VI. HOR. SCIT. NEM. Vixit annos triginta novem, mensem unum, dies sex, horas scit nemo.
FO. FR. Forum.
F. R. Forum Romanum.

G

G. Gellius, Gaius *pro* Caius, genius, gens, gaudium, gesta, gratia, gratis, &c.
GAB. Gabinius.
GAL. Gallus, Gallerius.
G. C. Genio civitatis.
GEN. P. R. Genio populi Romani.
GL. Gloria.

Abbrevia-
tion.

GL. S. Gallus Sempronius.
GN. Gneus *pro* Cneus, genius, gens.
GNT. Gentes.
GRA. Gracchus.
GRC. Græcus.

H

H. Hic, habet, hastatus, hæres, homo, hora, hostis, herus.
H. A. Hoc anno.
HA. Hadrianus.
HC. Hunc, huic, hic.
HER. Hæres, hereditatis, Herennius.
HER. *vel* HERC. S. Herculi sacrum.
H. M. E. H-S. CCIOO. CCIOO. IOO. M. N. Hoc monumentum erexit sestertiis viginti quinque mille nummum.
H. M. AD. H. N. T. Hoc monumentum ad hæredes non transit.
H. O. Hostis occifus.
HOSS. Hostes.
H. S. Hic situs *vel* sita, sepultus *vel* sepulta.
H-S. N. IIII. Sestertiis nummum quatuor.
H. S. CCCC. Sestertiis quatuor centum.
H-S. ∞. N. Sestertiis mille nummum.
H-S. ∞ CCIOO. N. Sestertiis novem mille nummum.
H-S. CCIOO. CCIOO. Sestertiis viginti mille.
H-S. XXM. N. Sestertiis viginti mille nummum.
H. SS. Hic supra scriptis.

I

I. Junius, Julius, Jupiter, ibi, idest, immortalis, imperator, inferi, inter, invenit, invictus, ipse, iterum, judex, jussit, jus, &c.
IA. Intra.
I. AG. In agro.
I. AGL. In angulo.
IAD. Jamdudum.
IAN. Janus.
IA. RI. Jam respondi.
I. C. Juris consultus, Julius Cæsar, judex cognitionum, IC. Hic.
I. D. Inferis diis, Jovi dedicatum, Iſidi deæ, jussu deæ.
ID. Idus.
I. D. M. Jovi Deo magno.
I. F. *vel* I. FO. In foro.
IF. Interfuit. IFT. Interfuerunt.
I. FNT. In fronte.
IG. Igitur.
I. H. Jacet hic.
I. I. In jure.
IM. Imago, immortalis, imperator.
I. M. CT. In medio civitatis.
IMM. Immolavit, immortalis, immunis.
IM. S. Impensis suis.
IN. Inimicus, inscriptus, interea.
IN. A. P. XX. In agro pedes viginti.
IN. *vel* INL. V. I. S. Inlustris vir infra scriptus.
I. R. Jovi regi, Junoni reginæ, jure rogavit.
I. S. *vel* I. SN. In senatum.
I. V. Justus vir.
IVD. Judicium.
IVV. Juventus, Juvenalis.
II. V. Duum-vir, *vel* duum-viri.
III. V. *vel* III. VIR. Trium-vir, *vel* trium-viri.
IIII. VIR. Quatuor-vir, *vel* quatuor-viri, *vel* quatuor viratus.

IIIIII.

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tion.

IIIII. V. *vel* VIR. Sextum-vir, *vel* se-vir, *vel* sex-vir.
IDNE. *vel* IND. *aut* INDICT. Indictio, *vel* indictione.

K

K. Cæso, Caius, Caio, Cælius, Carolus, calumnia, candidatus, caput, carissimus, clarissimus, castra, cohors, Carthago, &c.
K. KAL. KL. KLD. KLEND. Kalendæ, *aut* kalendis; *et sic de cæteris ubi mensium apponuntur nomina.*
KARC. Carcer.
KK. Carissimi.
KM. Carissimus.
K. S. Carus suis.
KR. Chorus.
KR. AM. N. Carus amicus noster.

L

L. Lucius, Lucia, Lælius, Lollius, lares, Latinus, latum, legavit, lex, legio, libens *vel* lubens, liber, libera, libertus, liberta, libra, locavit, &c.
L. A. Lex alia.
L.A. C. Latini coloni.
L. A. D. Locus alteri datus.
L. AG. Lex agraria.
L. AN. Lucius Annius, *vel* quinquaginta annis.
L. AP. Ludi Apollinares.
LAT. P. VIII. E. S. Latum pedes octo et semis.
LONG. P. VII. L. P. III. Longum pedes septem, latum pedes tres.
L. ADQ. Locus adquisitus.
LB. Libertus, liberi.
L. D. D. D. Locus datus decreto decurionum.
LECTIST. Lectisternium.
LEG. I. Legio prima.
L. E. D. Lege ejus damnatus.
LEG. PROV. Legatus provinciæ.
LIC. Licinius.
LICT. Licitor.
LL. Libentissimè, liberi, libertas.
L. L. Sestertius magnus.
LVD. SÆC. Ludi sæculares.
LUPERC. Lupercalia.
LV. P. F. Ludos publicos fecit.

M

M. Marcus, Marca, Martius, Mutius, maceria, magister, magistratus, magnus, manes, mancipium, marmoreus, marti, mater, maximus, memor, memoria, mensis, meus, miles, militavit, militiâ, mille, missus, monumentum, mortuus, &c.
MAG. EQ. Magister equitum.
MAR. VLT. Mars ultor.
MAX. POT. Maximus pontifex.
MD. Mandatum.
MED. Medicus, medius.
MER. Mercurius, mercator.
MERK. Mercurialia, mercatus.
MES. VII. DIEB. XI. Mensibus septem, diebus undecim.
M. I. Maximo Jovi, matri Idææ *vel* Ididi, militiæ jus, monumentum jussit.
MIL. COH. Miles cohortis.
MIN. *vel* MINER. Minerva.
M. MON. MNT. MONET. Moneta.
M. *vel* MS. Mensis *vel* menses.
MNF. Manifestus.

Abbrevia-
tion.

MNM. Manumissus.
M. P. II. Millia passuum duo.
MV. MN. MVN. MVNIC. Municipium *vel* municeps.

N

N. Neptunus, Numerius, Numeria, Nonius, Nero, nam, non, natus, natio, nefastus, nepos, neptis, niger, nomen, nonæ, nofter, numerarius, numerator, numerus, nummus *vel* numisma, numen.
NAV. Navis.
N. B. Numeravit bivirus *pro* vivus.
NB. *vel* NBL. Nobilis.
N. C. Nero Cæsar, *vel* Nero Claudius.
NEG. *vel* NEGOT. Negotiator.
NEP. S. Neptuno sacrum.
N. F. N. Nobili familia natus.
N. L. Non liquet, non licet, non longè, nominis Latini.
N. M. Nonius Macrinus, non malum, non minus.
NN. Nostri. NNR. *vel* NR. Nostrorum.
NO. Nobis.
NOBR. November.
NON. AP. Nonis Aprilis.
NQ. Namque, nusquam, nunquam.
N. V. N. D. N. P. O. Neque vendetur, neque donabitur, neque pignori obligabitur.
NVP. Nuptiæ.

O

O. Officium, optimus, olla, omnis, optio, ordo, ossa, ostendit, &c.
OB. Obiit.
OB. C. S. Ob cives servatos.
OCT. Octavianus, October.
O. E. B. Q. C. Ossa ejus benè quiescant condita.
O. H. F. Omnibus honoribus functus.
ONA. Omnia.
OO. Omnes, omnino. O. O. Optimus ordo.
OP. Oppidum, opiter, oportet, optimus, opus.
OR. Ornamentum.
OTIM. Optimæ.

P

P. Publius, passus, patria, pecunia, pedes, perpetuus, pius, plebs, populus, pontifex, posuit, potestas, præses, prætor, pridie, pro, post, provincia, puer, publicus, publicè, primus, &c.
PA. Pater, Patricius.
PAE. ET. ARR. COS. Pæto et Arrio consulibus.
P. A. F. A. Postulo an fias auctor.
PAR. Parens, parilia, Parthicus.
PAT. PAT. Pater patriæ.
PBLC. Publicus.
PC. Procurator.
P. C. Post consulatum, patres conscripti, patronus coloniarum, ponendum curavit, præfectus corporis, pactum conventum.
PED. CXVS. Pedes centum quindecim semis.
PEG. Peregrinus.
P. II. ∞. L. Pondo duarum semis librarum.
P. II. S. ∴ Pondo duo semis et triente.
P. KAL. Pridiè kalendas.
POM. Pompeius.
P. P. P. C. Propria pecunia ponendum curavit.
P. R. C. A. DCCCXLIII. Post Romam conditam annis octingentis quadraginta quatuor.
PRO. Proconsul. P. PR. Pro-prætor. P. PRR. Pro-prætores.

PR.

Abbrevia-
tion.

PR. N. Pro nepos.
P. R. V. X. Populi Romani vota decennalia.
PS. Paffus, plebifcitum.
PUD. Pudicus, pudica, pudor.
PUR. Purpureus.

Q

Q. Quinquennalis, quartus, quintus, quando, quantum, qui, quæ, quod, Quintus, Quintius, Quintilianus, quæstor, quadratum, quæfitus.
Q. B. AN. XXX. Qui bixit, *id est* vixit, annos triginta.
QM. Quomodo, quem, quoniam.
QQ. Quinquennalis. QQ. V. Quoquo verfum.
Q. R. Quæstor reipublicæ.
Q. V. A. III. M. II. Qui *vel* quæ vixit annos tres, menses duo.

R

R. Roma, Romanus, rex, reges, Regulus, rationalis, Ravennæ, recta, recto, requietorium, retro, rostra, rudera, &c.
RC. Rescriptum.
R. C. Romana civitas.
REF. C. Reficiendum curavit.
REG. Regio.
R. P. RESP. Respublica.
RET. P. XX. Retro pedes viginti.
REC. Requiescit.
RMS. Romanus.
ROB. Robigalia, Robigo.
RS. Responfum.
RVF. Rufus.

S

S. Sacrum, facellum, scriptus, semis, fenatus, sepultus, sepulcrum, sanctus, fervus, ferva, Servius, sequitur, sibi, fitus, solvit, sub, stipendium, &c.
SAC. Sacerdos, sacrificium.
SÆ. vel SÆC. Sæculum, sæculares.
SAL. Salus.
S. C. Senatus-consultum.
SCI. Scipio.
S. D. Sacrum diis.
S. EQ. Q. O. ET. P. R. Senatus, equefterque ordo et populus Romanus.
SEMP. Sempronius.
SL. SVL. SYL. Sylla.
S. L. Sacer ludus, sine lingua.
S. M. Sacrum manibus, sine manibus, sine malo.
SN. Senatus, sententia, sine.
S. P. Sine pecunia.
S. P. Q. R. Senatus populusque Romanus.
S. P. D. Salutem plurimam dicit.
S. T. A. Sine *vel* sub tutoris auctoritate.
SLT. Scilicet.
S. E. T. L. Sit ei terra levis.
SIC. V. SIC. X. Sicut quinquennalia, sic decennalia.
SSTVP. XVIII. Stipendiis novem decim.
ST. XXXV. Stipendiis triginta quinque.

T

T. Titus, Tullius, tantum, terra, tibi, ter, testamentum, titulus, terninus, triarius, tribunus, turma, tutor, tutela, &c.
TAB. Tabula. TABVL. Tabularius.
TAR. Tarquinius.
TB. D. F. Tibi dulcissimo filio.
TB. PL. Tribunus plebis.
TB. TI. TIB. Tiberius.

T. F. Titus Flavius, Titi filius.
THR. Thrax.
T. L. Titus Livius, Titi libertus.
TIT. Titulus.
T. M. Terminus, thermæ.
TR. PO. Tribunitia potestas.
TRAJ. Trajanus.
TUL. Tullius *vel* Tullius.
TR. V. Trium-vir.
TT. QTS. Titus Quintus.
© *vel* TH. AN. Mortuus anno.
© XIII. Defunctus viginti tribus.

V

V. Quinque, quintò, quintum.
V. Vitellius, Volera, Volero, Volufus, Vopifcus, vale, valeo; Vesta, vestalis, vestis, vester, veteranus, vir, virgo, vivus, vixit, votum, vovit, urbs, ufus, uxor, victus, victor, &c.
V. A. Veterano assignatum.
V. A. I. D. XI. Vixit annum unum, dies undecim.
V. A. L. Vixit annos quinquaginta.
V. B. A. Viri boni arbitrato.
V. C. Vale conjux, vivens curavit, vir confularis, vir clariffimus, quintum consul.
VDL. Videlicet.
V. E. Vir egregius, vifum est, verum etiam.
VESP. Vespafianus.
VI. V. Sextum-vir. VII. V. Septem-vir. VIII. VIR. octum-vir.
VIX. A. FF. C. Vixit annos ferme centum.
VIX. AN. ^{XX}. Vixit annos triginta.
ULPS. Ulpianus, Ulpus.
V. M. Vir magnificus, vivens mandavit, volens merito.
V. N. Quinto nonas.
V. MUN. Vias munivit.
VOL. Volcania, Voltinia, Volufus.
VONE. Bonae.
VOT. V. Votis quinquennialibus.
VOT. V. MULT. X. Votis quinquennialibus, multis decennialibus.
VOT. X. Vota decennalia.
VOT. XX. *vel* XXX. *vel* XXXX. Vota vicennalia, aut tricennalia, aut quadragenalia.
V. R. Urbs Roma, votum reddidit.
VV. CC. Viri clariffimi.
UX. Uxor.

X

X. AN. Annalibus decennialibus.
X. K. OCT. Decimo kalendas Octobris.
X. M. Decem millia. X. P. Decem pondo.
X. V. Decem-vir XV. VIR. Quindecim-vir.

ABBREVIATION of fractions, in *Aritbmetic* and *Algebra*, is the reducing them to lower terms.

ABBREVIATOR, in a general sense, a person who abridges any large book into a narrower compass.

ABBREVIATORS, a college of 72 persons in the chancery of Rome, who draw up the pope's briefs, and reduce petitions, when granted by him, into proper form for being converted into bulls.

ABB'S (ST) HEAD, a promontory of land in the southern extremity of the frith of Forth, in Scotland, 10 miles north of Berwick, and nearly the same distance

Abbrevia-
tion
||
Abb's.

Abbutals stance south of Dunbar. W. Long. 1. 56. N. Lat. 55. 55.

Abdalonymus.

ABBUTALS, signify the buttings or boundings of land towards any point. Limits were anciently distinguished by artificial hillocks, which were called *botsmines*; and hence *butting*. In a description of the site of land, the sides on the breadth are more properly *adjacentes*, and those terminating the length are *abbutantes*; which, in old surveys, were sometimes expressed by *capitare*, to head, whence abbutals are now called *head lands*.

ABCEDARY, or **ABCEDARIAN**, an epithet given to compositions, the parts of which are disposed in the order of the letters of the alphabet: thus we say, *Abcedarian psalms, lamentations, hymns, &c.* such are *Psal. xxv. xxxiv. cxix. &c.*

ABCOURT, a town near St Germain's, four leagues from Paris. Here is a brisk chalybeate water, which is also impregnated with carbonic acid and soda; and resembling the waters of Spa and Ilmington.

ABDALLA, the son of Abdalmotalleb, was the father of the prophet Mahomet. He was the most beautiful and modest of the Arabian youth, and when he married Amina, of the noble race of the Zahrites, 200 virgins are said to have died of jealousy and despair. Several other Arabians of eminence bore the same name.

ABDALMALEK, the son of Mirvan, and the 5th caliph of the race of the Omniades. He surpassed all his predecessors in power and dominion; for in his reign the Indies were conquered in the east, and his armies penetrated Spain in the west: he likewise extended his empire toward the south, by making himself master of Medina and Mecca. Under his reign the Greek language and character were excluded from the accounts of the public revenue. If this change, says Gibbon, was productive of the invention or familiar use of the Arabic or Indian cyphers, which are our present numerals, a regulation of office has promoted the most important discoveries of arithmetic, algebra, and the mathematical sciences. His extreme avarice exposed him to the contempt and derision of his subjects, who gave him the appellation of *the sweat of a stone*; and his fetid breath, it is said, poisoned the flies which accidentally lighted on his lips, whence he was called the *father of flies*. He began his reign in the 65th of the Hegira, A. D. 684; reigned 15 years; and four of his sons successively enjoyed the caliphate.

ABDALMALEK, *Ben Zohar*, an eminent physician, commonly called by the Europeans *Avenzoar*. See **AVENZOAR**.

ABDALMOTALLEB, or **ABDOL MOTALLEB**, the son of Hashem, the father of Abdalla, and grandfather of Mahomet the prophet of the Mussulmans, it is said, of such wonderful comeliness and beauty, that all women who saw him became enamoured: which may have given occasion to that prophetic light, which, according to the Arabians, shone on the foreheads of him, his ancestors, and descendants; it being certain that they were very handsome and graceful men. He died when Mahomet, of whom he had taken peculiar care, was only eight or nine years old; aged, according to some, 110, and according to other writers 120.

ABDALONYMUS, or **ABDOLONYMUS**, in *Classic History*, of the royal family of Sidon, and descended

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from King Cinyras, lived in obscurity, and subsisted by cultivating a garden, while Strato was in possession of the crown of Sidon. Alexander the Great having deposed Strato, inquired whether any of the race of Cinyras was living, that he might set him on the throne. It was generally thought that the whole race was extinct: but at last Abdalonymus was thought of, and mentioned to Alexander; who immediately ordered some of his soldiers to fetch him. They found the good man at work, happy in his poverty, and entirely a stranger to the noise of arms, with which all Asia was at that time disturbed; and they could scarcely persuade him they were in earnest. Alexander was convinced of his high descent by the dignity of his person; but was desirous of learning from him in what manner he bore his poverty. "I wish" said Abdalonymus, "I may bear my new condition as well: These hands have supplied my necessities: I have had nothing, and I have wanted nothing." This answer pleased Alexander so much, that he not only bestowed on him all that belonged to Strato, but augmented his dominions, and gave him a large present out of the Persian spoils.

ABDALS, in the Eastern countries, a kind of saints supposed to be inspired to a degree of madness. The word is perhaps derived from the Arabic, *Abdallah*, the servant of God. The Persians call them *devaneh kboda*, similar to the Latin way of speaking of prophets and sibyls, *q. d. furentes deo*, raging with the god. Hurried on by excess of zeal, especially in the Indies, they often run about the streets, and kill all they meet who are of a different religion. The English sailors call this, *running a muck*, from the name of the instrument, a sort of poniard, which they employ on those desperate occasions. If they are killed, as it commonly happens before they have done much mischief, they reckon it highly meritorious; and are esteemed, by the vulgar, martyrs for their faith.

ABDARA, or **ABDERA**, in *Ancient Geography*, a town of Bœticia in Spain, a Phœnician colony; now *Adra*, to the west of Almeira in the kingdom of Granada.

ABDERA, in *Ancient Geography*, a maritime town of Thrace, not far from the mouth of the river Nessus, on the east side. The foundation, according to Herodotus, was attempted to be laid by Timæus the Clazomenian; but he was forced by the Thracians to quit the design. The Teians undertook it, and succeeded and settled in this place, in order to avoid the insults and oppression of the Persians.—Several singularities are told of Abdera*. The grass of the country round it was of such a quality, that the horses which fed on it were seized with madness. In the reign of Cassander king of Macedon, this city was so infested with frogs and rats, that the inhabitants were forced for a time to quit it.—The Abderites, or Abderitani, were very much derided for their want of wit and judgment: yet their city has given birth to several eminent persons; as Protagoras, Democritus, Anaxarchus, Hecateus the historian, Nicænetus the poet, and many others, who were mentioned among the illustrious men.—In the reign of Lyfimachus, Abdera was afflicted for some months with a most extraordinary disease †: this was a burning fever, whose crisis was always on the seventh day, and then it left them; but it so distracted their imaginations, that they fancied themselves players. After this, they were ever repeating verses from some tragedy, and particularly

Abdals
Abdera.

* Plinii lib. xxv. c. 8. Just. lib. xxv. c. 2.

† Lucianus, *Hist. sit con- scribendus initio.*

C

from

Abderahma
Abdication

A B D [18] A B D
from the *Andromeda* of Euripides, as if they had been upon the stage; so that many of these pale meagre actors were pouring forth their tragic exclamations in every street. This delirium continued till the winter following; which was a very cold one, and therefore fitter to remove it. Lucian, who has described this disease, endeavours to account for it in this manner: Archelaus, an excellent player, acted the *Andromeda* of Euripides before the *Abderites*, in the height of a very hot summer. Several had a fever at their coming out of the theatre; and as their imaginations were full of the tragedy, the delirium which the fever raised perpetually represented *Andromeda*, *Perseus*, *Medusa*, &c. and the several dramatic incidents, and called up the ideas of those objects, and the pleasure of the representation, so strongly, that they could not forbear imitating *Archelaus's* action and declamation: And from these the fever spread to others by infection.

ABDERAHMA, a Saracen viceroy in Spain, who revolted and formed an independent principality at Cordova. He had several successors of the same name.

A viceroy and captain-general of this name led the Saracens and their followers into France, ravaging the country wherever they came. At length he was met at Tours by Charles Martel, who had received reinforcements of Germans and Gepidae; and after many skirmishes the Saracen army, in a general action, was totally routed, and *Abderahma* was killed with 370,000 Moors. This great event, which first broke the power of the Saracens, and taught the Europeans that they were not invincible, happened about the year 732 of the Christian era, and of the *Hegira* 114.

ABDEST, a Persian word, properly signifying the water placed in a basin for washing the hands; but is used to imply the legal purifications practised by the Mahometans before prayer, entering the mosque, or reading the *Alcoran*.

ABDIAS OF BABYLON, one of the boldest legend writers, who boasted that he had seen Christ, that he was one of the 70 disciples, had been eye-witness of the actions and prayers of several of the apostles at their deaths, and had followed into Persia St Simon and St Jude, who, he said, made him the first bishop of Babylon. His book, entitled *Historia Certaminis Apostolicae*, was published by Wolfgang Lazius, at Basil, 1551; and has passed through several editions in other places.

ABDICATION, the action whereby a magistrate, or person in office, renounces and gives up the same before the term of service is expired.

This word is frequently confused with *resignation*; but differs from it; for abdication is done purely and simply, whereas resignation is in favour of some third person. In this sense, *Dioclesian* is said to have abdicated the crown; *Philip the IV.* of Spain resigned it. It is said to be a renunciation, quitting, and relinquishing, so as to have nothing further to do with a thing; or the doing of such actions as are inconsistent with the holding of it. On King James's leaving the kingdom, and abdicating the government, the lords proposed that the word *deserison* should be employed; but the commons thought that it was not sufficiently comprehensive. Among the Roman writers it is more particularly used for the act whereby a father discard-

ed or disclaimed his son, and expelled him the family. It is distinguished from *exheredatio* or *disinheriting*, in that the former was done in the father's lifetime; the latter, by will at his death: so that whoever was abdicated, was also disinherited; but not vice versa.

ABDOLLATIPHI, a physician, was born at Bagdad in the 557th year of the *Hegira*, A. D. 1161. Having been educated with the greatest care by his father, who was himself a man of learning, and resided in a capital which abounded with the best opportunities of instruction, he early distinguished himself not only by proficiency in rhetoric, history, and poetry, but also in the more severe studies of Mohammedan theology. To the acquirement of medical knowledge he applied with especial diligence; and it was chiefly with this view that, in his 28th year, he left Bagdad, in order to visit other countries. At Mosul, in Mesopotamia, whither he first directed his course, he found the attention of the students entirely confined to the chemistry of that day, with which he was already sufficiently acquainted. Having spent a year at Mosul, he removed to Damascus in Syria, where the grammarian *Al Kindi* then enjoyed the highest reputation; and with whom he is said to have engaged in a controversy on some subjects of grammar and philology, which terminated in favour of *Abdollahiph*.

At this time, Egypt had yielded to the arms of Saladin, who was marching against Palestine for the purpose of wresting that country from the hands of the Christians: yet towards Egypt *Abdollahiph* was irresistibly impelled by that literary curiosity which so strongly marked his character. To the successful prosecution of this journey, the consent and patronage of the sultan were indispensably necessary: but when the Arabian physician arrived at the camp near Acca, (the ancient Ptolemais, now Acre) to solicit his powerful protection, he found the Saracens bewailing a defeat which they had recently experienced; a defeat so honourable to the skill and valour of our English *Richard*, that nothing less than the late matchless defence of this fortress, by a handful of British seamen and marines, could have detracted from its importance, or eclipsed its glory. Hence the lofty spirit of the sultan was plunged into a morbid melancholy, which excluded the traveller from his presence; but the favours which he received evinced the munificence of Saladin, and he persisted in his design of exploring the wonders of Egypt. One strong inducement which influenced him on this occasion, was the instruction, which he hoped to derive from the society of the celebrated *Maimonides*; and by *Al Kadi Al Fadel*, who had earnestly but unavailingly solicited him to return to Damascus, he was furnished with such recommendations as procured for him the most flattering reception at Cairo. His talents and his virtues confirmed and increased the kindness with which he was welcomed on his first arrival; and the Egyptians of the highest rank continued to vie with each other in cultivating his friendship.

From this intercourse, however, with the great and the learned, *Abdollahiph* withdrew, in order to present himself before the sultan; who, having concluded a truce with the Franks, then resided in the Holy City. Here he was received by Saladin with every expression of esteem for his character and attainments.

Abdolla-
tiph.

Abdomen,
Abdomina-
les.

To a dignified politeness, and condescending freedom, this prince is said to have added a munificent liberality in the patronage of science and of art; and of this fact, indeed, we have a laudable instance in the pension which he granted to Abdollatiph, and which amounted to 30 dinars per month. After the death of the sultan, this sum was raised by his sons to 100 dinars, till the ambition of their uncle forced them from the throne of Egypt and of Syria; and thus was our traveller compelled to resort again to Damascus, after a short abode at Jerusalem: where his lectures, and his treatises, were equally the objects of general admiration.

In the capital of Syria, his pursuits were of the same nature, and attended with similar success. His practice as a physician was extensive. To the students in the college of Al Aziz, he freely communicated the ample stores of his cultivated mind; and in the works which he composed on the principles of medicine, he displayed that depth of research and that felicity of illustration, which are the rare effects of genius combined with diligence, judgment, and erudition.

Such is the testimony given to the exertions of our author; and it is added that they were rewarded at Damascus not with fame alone, but also with riches. Yet neither the applause of the wise nor the patronage of the wealthy had power to detain him, when other scenes or other society promised to gratify his curiosity, or to increase his knowledge. On this account, probably, he left Damascus, and, after having visited Aleppo, resided several years in Greece. With the same view he travelled through Syria, Armenia, and Asia Minor, still adding to the number of his works; many of which he dedicated to the princes whose courts he visited, or whose subjects he laboured to instruct.

After having thus enriched his own mind, and contributed so successfully to the improvement of others, sentiments of devotion induced him to undertake a pilgrimage to Mecca. In the mean time, however, he seems to have experienced the full force of that desire, which in the native of Switzerland has often been known to supersede every other,—the desire of once more beholding the place which gave him birth. He wished also to present the fruits of his travels, and of his studies, to the caliph Al Mostanser Billah. He therefore eagerly journeyed towards Bagdad, which, after so long an absence, he no doubt beheld with emotions of tender exultation:—but all his hopes were disappointed! Scarcely had he reached his native city, when he was suddenly taken ill, and died in his 63d year, A. D. 1223. Of 150 treatises which he composed on various subjects of medicine, natural philosophy and polite literature, only one, entitled *Historiæ Egypti Compendium*, has survived the ravages of time. This manuscript, the only one which has been discovered, was brought to Europe by the celebrated orientalist Pococke, and is now preserved in the Bodleian library. Dr White of Oxford published an edition of the original Arabic, with an elegant Latin version in 4to, in 1800. (*Month. Rev.*)

ABDOMEN, in *Anatomy*, is that part of the trunk of the body which lies between the thorax and the bottom of the pelvis. See *ANATOMY*.

ABDOMINALES, or ABDOMINAL FISHES, con-

stitute the Fourth Order of the *Fourth Class* of Animals, in the Linnæan system. See *ICHTHYOLOGY*.

ABDUCTION, in *Logic*, a kind of argumentation, by the Greeks called *apagoge*, wherein the greater extreme is evidently contained in the medium, but the medium not so evidently in the lesser extreme as not to require some farther medium or proof to make it appear. It is called *abduction*, because, from the conclusion, it draws us on to prove the proposition assumed. Thus, in the syllogism, "All whom God absolves are free from sin; but God absolves all who are in Christ; therefore all who are in Christ are free from sin,"—the major is evident; but the minor, or assumption, is not so evident without some other proposition to prove it, as, "God received full satisfaction for sin by the sufferings of Jesus Christ."

ABDUCTOR, or ABDUCENT, in *Anatomy*, a name given to several of the muscles, on account of their serving to withdraw, open, or pull back the parts to which they belong.

ABEL, second son of Adam and Eve, was a shepherd. He offered to God some of the firstlings of his flock, at the same time that his brother Cain offered the fruits of the earth. God was pleased with Abel's oblation, but displeased with Cain's; which so exasperated the latter, that he rose up against his brother and killed him. These are the only circumstances Moses relates of him; though, were we to take notice of the several particulars to which curiosity has given birth on this occasion, they would run to a very great length. But this will not be expected. It is remarkable, that the Greek churches, who celebrate the feasts of every other patriarch and prophet, have not done the same honour to Abel. His name is not to be found in any catalogue of saints or martyrs till the 10th century; nor even in the new Roman martyrology. However he is prayed to, with some other saints, in several Roman litanies said for persons who lie at the point of death.

ABEL-Keramim, or *Vinearum*, beyond Jordan, in the country of the Ammonites, where Jephthah defeated them, seven miles distant from Philadelphia, abounding in vines, and hence the name. It was also called *Abela*.

ABEL-Meholah, the country of the prophet Elisha, situated on this side Jordan, between the valley of Jezreel and the village Bethmael, in the plains of Jordan, where the Midianites were defeated by Gideon. Judges vii. 22.

ABEL-Mizraim, (called also the Threshing-floor of Atad), signifying the lamentation of the Egyptians; in allusion to the mourning for Jacob, Gen. i. 3, 12, 11. Supposed to be near Hebron.

ABEL-Mosch, or *Abelmusch*, in *Botany*, the trivial name of a species of the *HIBISCUS*.

ABEL-Sattim, or *Sittim*, a town in the plains of Moab, to the north-east of the Dead Sea, not far from Jordan, where the Israelites committed fornication with the daughters of Moab: So called, probably, from the great number of sittim trees there.

ABELARD, PETER, an eminent scholastic philosopher of France, the son of Berenger, of noble descent, was born at Palais near Nantes in Bretagne, in the year 1079. Abelard had received from nature a vigorous and active mind; but it was his lot to live at a period, when logic, metaphysics, and polemic theology,

Abductio
Abelard.

Abelard. logy constituted a learned education, when abstruse speculations and verbal subtleties occupied the ingenuity of literary men, and distinguished talents for disputation led to honour and preferment. Devoted to letters by his father's appointment, and by his own inclination, his literary attainments could at this time only be exhibited in the field of scholastic philosophy; and, that he might be fitted for his destined career of life, he was placed, after a previous course of grammatical studies, under the tuition of Rosceline, a celebrated metaphysician, and founder of the sect of the Nominalists. Under the instructions of this able master, at the early age of sixteen, he furnished himself with a large store of scholastic knowledge, and acquired a subtlety and quickness of thought, a fluency of speech, and facility of expression, which were necessary qualifications in scholastic disputation.

Having spent some time in visiting the schools of several provinces, after the example of the ancient philosophers who travelled in search of wisdom, in the twentieth year of his age, he fixed his residence in the university of Paris, then the first seat of learning in Europe. The master, William de Champeaux, was at that time in high repute for his knowledge of philosophy, and his skill in the dialectic art; to him he committed the direction of his studies, and was at first contented with receiving instruction from so eminent a preceptor. De Champeaux was proud of the talents of his pupil, and admitted him to his friendship. But the aspiring youth ventured to contradict the opinions of his master, and in the public school held disputations with him, in which he was frequently victorious. The jealousy of the master and the vanity of the pupil naturally occasioned a speedy separation.

Elated by success, and confident of his own powers, Abelard, without hesitation, at the age of twenty-two, opened a public school of his own. "I was young indeed," says he, "but confident of myself, my ambition had no bounds: I aspired to the dignity of a professor, and only waited till I could fix on a proper place to open my lectures." Melun, a town ten leagues from Paris, where the court frequently resided, was the place which he chose for this bold display of his talents. But it was not without considerable difficulty that Abelard executed his plan; for de Champeaux, who regarded him as a rival, openly employed all his interest against him. Abelard at length prevailed, his school was opened, and his lectures were attended by crowded and admiring auditories. Emboldened by this success, and perhaps stimulated by unworthy resentment, Abelard resolved to maintain an open contest with his master, and for this purpose removed his school to Corbeil near Paris. The disputants frequently met in each other's schools; and the contest was supported on each side with great spirit, amidst crowds of their respective scholars. The young champion was in the end victorious, and his antagonist was obliged to retire.

Constant application and violent exertions had now so far impaired Abelard's health, that it was become necessary for him to interrupt his labours; and, with the advice of his physician, he withdrew to his native country. Two years afterwards, he returned to Corbeil, and found that de Champeaux had taken the monastic habit among the regular canons in the convent

of St Victor; but that he still continued to teach rhetoric and logic, and to hold public disputations in theology. Returning to the charge, he renewed the contest, and his opponent was obliged to acknowledge himself defeated; and the scholars of de Champeaux deserted him, and went over in crowds to Abelard. Even the new professor, who had taken the former school of de Champeaux, voluntarily surrendered the chair to the young philosopher, and requested to be enrolled among his disciples. A triumph so complete, while it gratified the vanity of Abelard, could not fail to provoke the resentment of his old master, who had influence to obtain the appointment of a new professor, and drive Abelard back to Melun. De Champeaux's motive for this violent proceeding was soon perceived; even his friends were ashamed of his conduct; and he retired from the convent into the country. When Abelard was informed of the flight of his adversary, he returned towards Paris, and took a new station at the abbey on Mount St Genevieve. His rival, the new professor, was unequal to the contest, and was soon deserted by his pupils, who flocked to the lectures of Abelard. De Champeaux too, returning to his monastery, renewed the struggle; but so unsuccessfully, that Abelard was again victorious.

During a short absence, in which Abelard visited his native place, de Champeaux was preferred to the see of Chalons. The long and singular contest between these philosophers terminated; and Abelard, perhaps for want of a rival to stimulate his exertions, or possibly through envy of the good fortune of his rival, determined to exchange the study and profession of philosophy for that of theology. He therefore quitted his school at St Genevieve, and removed to Laon, to become a scholar of Anselm. From this celebrated master he entertained high expectations; but they were soon disappointed. On attending his lectures he found, that, though he possessed uncommon fluency of language, he left his auditors without instruction. "You would have thought," says Abelard, "he was kindling a fire, when instantly the whole house was filled with smoke, in which not a single spark was visible: he was a tree covered with a thick foliage, which pleased the distant eye; but, on a nearer inspection, there was no fruit to be found: I went up to this tree in full expectation, but I saw that it was the fig-tree which the Lord had cursed." (*Hist. Calamit.*) Abelard gradually retired from these unprofitable lectures, but without offering offence either to the veteran professor, or his scholars. In conversation one of them asked him, what he thought of the study of the Scriptures? Abelard replied, that he thought the explanation of them a task of no great difficulty; and, to prove his assertion, he undertook to give a comment, the next day, upon any part of the Scriptures they should mention. They fixed upon the beginning of the prophecy of Ezekiel; and the next morning he explained the passage in a theological lecture, which was heard with admiration. For several successive days, the lectures were, at the request of the audience continued; the whole town pressed to hear them; and the name of Abelard was echoed through the streets of Laon. Anselm, jealous of the rising fame of this young theologian, prohibited his lectures, under the pretence that so young a lecturer might fall into mistakes, which would

Abelard. would bring discredit upon his master. Abelard, whose ambition required a wider field than that of Laon, obeyed the prohibition, and withdrew. He returned to Paris, whither the fame of his theological talents had arrived before him, and opened his school with his lectures on the prophecy of Ezekiel. His auditors were delighted; his school was crowded with scholars; and he united in his lectures the sciences of theology and philosophy with so much success, that multitudes repaired to his school from various parts of France, from Spain, Italy, Germany, Flanders, and Great Britain.

Hitherto Abelard has appeared with high distinction, as an able disputant, and a popular preceptor: we must now view him under a different character, and, when nearly arrived at the sober age of forty, see him, on a sudden, exchanging the school of philosophy for the bower of pleasure, and even disgracing himself, as will too plainly appear in the sequel, by forming and executing a deliberate plan for the seduction of female innocence. It happened that there was at this time, resident in Paris, Heloise, the niece of Fulbert, one of the canons of the cathedral church, a lady about eighteen years of age, of great personal beauty, and highly celebrated for her literary attainments. Abelard, whose vanity had been fatiated with fame, and the vigour of whose mind was now enervated by repose, found himself inclined to listen to the voice of passion. He beheld with ardent admiration the lovely Heloise, and confident that his personal attractions were still irresistible, he determined to captivate her affections. Fulbert, who doubtless thought himself honoured by the visits of so eminent a scholar and philosopher, received him into his house as a learned friend. He was soon afterwards prevailed upon, by a handsome payment which Abelard offered for his board, to admit him into his family; and, apprehending no hazard from a man of Abelard's age and profession, confidentially requested him to undertake the instruction of Heloise. Abelard accepted the trust, but, as it seems, without any other intention than to betray it. The hours of instruction were employed in other lessons than those of learning and philosophy; and to such a master as Abelard, it was not surprising that Heloise was an apt scholar. Fulbert's respectful opinion of the philosopher, and his partiality for his niece, long concealed from him an amour, which was become the subject of general conversation. At length the discovery burst upon him like a clap of thunder. Upon discovering her pregnancy, it was thought necessary for her to quit her uncle's house, and Abelard conveyed her to Bretagne, where his sister was prepared to receive them. Here Heloise was delivered of a son, to whom they gave the whimsical name of Astrolabus. Abelard, upon the birth of the child, proposed to Fulbert to marry his niece, provided the marriage might be kept secret: Fulbert consented, and Abelard returned to Bretagne to fulfil his engagement. Heloise, partly out of regard to the honour of Abelard, whose profession bound him to celibacy, and partly from a romantic notion that love like hers ought not to submit to ordinary restraints, at first gave Abelard a peremptory refusal. He, however, at last prevailed, and they were privately married at Paris. Heloise from this time met with severe treatment from

her uncle, which furnished Abelard with a plea for removing her from his house, and placing her in the abbey of Benedictine nuns, in which she had been educated. Fulbert concluded, perhaps not without reason, that Abelard had taken this step, in order to rid himself of an incumbrance which obstructed his future prospects. Deep resentment took possession of his soul, and he meditated revenge. He employed several ruffians to enter his chamber by night, and inflict upon his person a disgraceful and cruel mutilation. The deed was perpetrated; the ruffians were taken, and suffered, according to the *Lex Talionis*, the punishment they had inflicted; and Fulbert, for his savage revenge, was deprived of his benefice, and his goods were confiscated. Unable to support his mortifying reflections, Abelard resolved to retire to a convent. At the same time he formed the selfish resolution, that, since Heloise could no longer be his, she should never be another's, and ungenerously demanded from her a promise to devote herself to religion; and even insisted upon her taking the holy vow before him, suspecting, as it seems, that if he first engaged himself, she might violate her promise, and return to the world; a circumstance, with which she afterwards thus tenderly reproached him: "In that one instance, I confess, your mistrust of me tore my heart; Abelard, I blushed for you." Heloise submitted to the harsh injunction, professed herself in the abbey of Argenteuil, and receiving the religious habit, exclaimed in the words of Cornelia:

————— *O maxime conjux!*
O thalamis indigne meis! hoc juris habebat
In tantum fortuna caput? cur impia nupsit,
Si miserum factura fui? nunc accipe penas,
Sed quas sponte luam.

LUCAN.

"Ah! my once greatest lord! Ah! cruel hour!
 Is thy victorious head in Fortune's pow'r!
 Since miseries my baneful love pursue,
 Why did I wed thee, only to undo?
 But see, to death my willing neck I bow;
 Atone the angry gods by one kind blow." ROWE.

A few days after Heloise had taken her vows, Abelard assumed the monastic habit in the abbey of St Denys, determined as it seems to forget, in hope of being forgotten by, the world. However, his admirers and scholars in Paris were unwilling that the world should lose the benefit of his labours, and sent deputies to entreat him to return to his school. After some deliberation, he again yielded to the call of ambition; and at a small village in the country, he resumed his lectures, and soon found himself surrounded with a numerous train of scholars. The revival of his popularity renewed the jealousy of other professors, who took the first opportunity of bringing him under ecclesiastical censure. A treatise which he published at this time, entitled, "The Theology of Abelard," was supposed to contain some heretical tenets. A synod was called at Soissons in the year 1121; the work was condemned to be burnt, and Abelard was commanded to throw it into the flames. After being involved in other controversies, new charges were brought against him, and he fled to the convent of St Ayoul at Provins in Champagne, the prior of which was his intimate friend. The place of his retreat was soon discovered, and threats

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threats and persuasions were in vain employed to recal him : at last he obtained permission to retire to some solitary retreat, on condition that he should never again become a member of a convent.

The spot which he chose was a vale in the forest of Champagne, near Nogent upon the Seine. Here Abelard, in 1122, erected a small oratory, which he dedicated to the Trinity, and which he afterwards enlarged and consecrated to the Third Person, the Comforter, or Paraclete. Here he was soon discovered, and followed by a train of scholars. A rustic college arose in the forest, and the number of his pupils soon increased to six hundred. Jealousy again provoked the exertions of his enemies, and he was meditating his escape, when, through the interest of the duke of Bretagne, and with the consent of the abbot of St Denys, he was elected superior of the monastery of St Gildas, in the diocese of Vannes, where, though not without frequent and grievous vexations, he remained several years.

About this time, Suger the abbot of St Denys, on the plea of an ancient right, obtained a grant for annexing the convent of Argenteuil, of which Heloise was now prioress, to St Denys, and the nuns, who were accused of irregular practices, were dispersed. Abelard, informed of the distressed situation of Heloise, invited her, with her companions, eight in number, to take possession of the Paraclete.

It was during Abelard's residence at St Gildas, that the interesting correspondence passed between him and Heloise, which is still extant. The letters of Heloise, in this correspondence, abound with proofs of genius, learning, and taste, which might have graced a better age. It is upon these letters that Mr Pope has formed his " Epistle from Eloisa to Abelard ;" a piece, which is entitled to the highest praise for its poetical merit, but which deviates in many particulars from the genuine character and story of Heloise, and culpably violates moral propriety. Here, too, Abelard probably wrote his " Theology," which again subjected him to persecution. His opinions were pronounced heretical by a council ; and although he appealed to Rome, the judgment of the council was confirmed by the pope ; and he was sentenced, unheard, to perpetual silence and imprisonment. By the interposition of some friends, however, and by a submissive apology, he obtained his pardon, with permission to end his days in the monastery of Cluni.

At Cluni he was retired, studious, and devout. The monks of the convent importuned him to resume the business of instruction. In a few occasional efforts he complied with their sollicitation ; and his lectures were heard with undiminished applause. But his health and spirits were much enfeebled, and gradually declined till he died in the 63d year of his age, A. D. 1142. His body was sent to Heloise to be interred in the convent of the Paraclete. Heloise survived her husband 21 years, a pattern of conjugal affection, and monastic virtue ; and was buried in the same grave, as appears by the following epitaph :

*Hic,
Sub eodem marmore, jacet
Hujus Monasterii
Conditor, Petrus Abelardus,*

*Et abbatissa prima, Heloisa,
Olim studios, ingenio, insaufis nuptiis
Et poenitentia,
Nunc aeterna, ut speramus, felicitate,
Conjuncti.*

*Petrus obiit 21 Aprilis 1142.
Heloisa 17 Maii 1163.*

The amotr, which has given Abelard so much celebrity, will remain an eternal blot upon his memory. It was not a juvenile indiscretion of which Abelard was guilty, but, according to his own confession, the seduction of innocence, deliberately planned, and resolutely executed. It was accompanied with breach of confidence, violation of duty, and degradation of character. Except in the grant of the Paraclete as an asylum to Heloise and her sisterhood, an uniform selfishness appears in Abelard's conduct. In Heloise, the criminality, though not obliterated, was palliated by youthful ardour and inexperience ; and extreme sensibility, romantic attachment, noble generosity, and disinterested invincible constancy, united to throw a veil over human frailty. Considered apart from this disgraceful affair, Abelard appears with more advantage. His writings, indeed, will not give the reader a high idea of his genius or taste : but it cannot be questioned, that the man who could foil the first masters of the age at the weapons of logic, could draw round him crowded and admiring auditories, and could collect scholars from different provinces and countries wherever he chose to form a school, must have possessed extraordinary talents. Had his love of truth been equal to his thirst of fame, and had his courage in adhering to his principles been equal to his ingenuity in defending them, his sufferings and persecutions might have excited more regret, and his title to honourable remembrance would have been better established. Upon the whole, of Abelard it may perhaps with truth be said, that he was too vain to be truly great, and too selfish to be eminently good, and that his character is rather adapted to excite admiration than to command respect.

His principal works, written in Latin, are, " An Address to the Paraclete on the Study of the Scriptures ; Problems and Solutions ; Sermons on the Festivals ; A Treatise against Heresies ; An Exposition of the Lord's Prayer ; A Commentary on the Romans ; A System of Theology ; and his Letters to Heloise and to others." (*Gen. Biog.*)

ABEL TREE, or ABLE TREE, an obsolete name for a species of the poplar. See POPULUS, *Botany-Index.*

ABELIANS, ABOLITES, or ABELONIANS, in *Church History*, a sect of heretics mentioned by St Austin, which arose in the diocese of Hippo in Africa, and is supposed to have begun in the reign of Arcadius, and ended in that of Theodosius. Indeed it was not calculated for being of any long continuance. Those of this sect regulated marriage after the example of Abel ; who, they pretended, was married, but died without ever having known his wife. They therefore allowed each man to marry one woman, but enjoined them to live in continence ; and, to keep up the sect, when a man and woman entered into this society, they adopted a boy and a girl, who were to inherit their goods, and to marry upon the same terms of not begetting

Abella getting children, but of adopting two of different sexes.

ABELLA, a town of Campania, near the river Clanus. The inhabitants were called Abellani, and said to have been a colony of Chalcidians. The nux Avellana, called also *Prænsina*, or the *basel nut*, takes its name from this town, according to Macrobius. Now *Avella*.

ABELLINUM, a town of the Hirpini, a people of Apulia; distant about a mile from the rivulet Sabatto, between Beneventum and Salernum. Pliny calls the inhabitants *Abellinates*, with the epithet *Protopi*, to distinguish them from the Abellinates Marfi. Now *Avellino*. E. Long. 15. 20. N. Lat. 21°.

ABEN EZRA, ABRAHAM, a celebrated rabbi, born at Toledo in Spain, called by the Jews, The wise, great, and admirable Doctor, was a very able interpreter of the Holy Scriptures; and was well skilled in grammar, poetry, philosophy, astronomy and medicine. He was also a perfect master of the Arabic. His principal work is, "Commentaries on the Old Testament," which is much esteemed: these are printed in Bomberg's and Buxtorf's Hebrew Bibles. His style is clear, elegant, concise, and much like that of the Holy Scriptures: he almost always adheres to the literal sense, and everywhere gives proofs of his genius and good sense: he, however, advances some erroneous sentiments. The scarcest of all his books is entitled "Jesid Mora;" which is a theological work, intended as an exhortation to the study of the Talmud. He also wrote *Elegantie Grammaticæ*, printed in octavo at Venice in 1548. He died in 1174, aged 75.

ABEN MELLER, a learned rabbin, who wrote a commentary on the Old Testament in Hebrew, entitled, "The Perfection of Beauty." This rabbin generally follows the grammatical sense and the opinions of Kimchi. The best edition is that of Holland.

ABENAS, a town of France, in Languedoc and in the Lower Vivarais, seated on the river Ardèche, at the foot of the Cevennes. E. Long. 4. 43. N. Lat. 44. 40.

ABENEL GAUBY, a fixed star of the second or third magnitude, in the fourth scale of the constellation LIBRA.

ABENSPERG, a small town of Germany, in the circle and duchy of Bavaria, and in the government of Munich. It is seated on the river Abentz, near the Danube. E. Long. 11. 38. N. Lat. 48. 45.

ABERAVON, a borough town of Glamorganshire in Wales, governed by a portreeve. It had a market, which is now discontinued. The vicarage is discharged, and is worth 45*l.* clear yearly value. It is seated at the mouth of the river Avon, 104 miles west of London. W. Long. 3. 21. N. Lat. 51. 40.

ABERBROTHICK, or ABERROATH, one of the royal boroughs of Scotland, situated in the county of Angus, about 40 miles N. N. E. of Edinburgh, in W. Long. 2. 29. and N. Lat. 56. 36. It is seated on the discharge of the little river Brothie into the sea, as the name imports, *Aber* in the British implying such a situation. It is a small but flourishing place, well built, and still increasing. The town has been in an improving state for the last forty years, and the number of inhabitants greatly augmented; which is owing to the introduction of manufactures. The population in 1801 was above 7000. The inhabitants

consist chiefly of weavers of coarse brown linens, and some sail-cloth; others are employed in making white and coloured threads: the remainder are either engaged in the shipping of the place, or in the necessary and common mechanic trades. The brown linens, or Ofnaburgs, were manufactured here before any encouragement was given by government, or the linen company erected at Edinburgh. It appears from the books of the stamp-office in this town, that seven or eight hundred thousand yards are annually made in the place, and a small district round. Besides this export and that of thread, much barley and some wheat is sent abroad. The foreign imports are flax, flax-seed, and timber, from the Baltic. The coasting trade consists of coals from Borrowtownnes, and lime from Lord Elgin's kilns in Fife. At this place, in default of a natural harbour, a tolerable artificial one of piers has been formed, where, at spring tides, which rise here fifteen feet, ships of two hundred tons can come, and of eighty at neap tides; but they must lie dry at low water. This port is of great antiquity: there is an agreement yet extant between the abbot and the burghers of Aberbrothick, in 1194, concerning the making of the harbour. Both parties were bound to contribute their proportions; but the largest fell to the share of the former, for which he was to receive an annual tax payable out of every rood of land lying within the borough. The glory of this place was the abbey, whose very ruins give some idea of its former magnificence. It was founded by William the Lion in 1178, and dedicated to our celebrated primate Thomas à Becket. The founder was buried there; but there are no remains of his tomb, or any other, excepting that of a monk of the name of Alexander Nicol. The monks were of the Tyronensian order; and were first brought from Kelfo, whose abbot declared those of this place, on the first institution, to be free from his jurisdiction. The last abbot was the famous Cardinal Beaton, at the same time archbishop of St Andrew's, and, before his death, as great and absolute here as Wolsey was in England. King John, the English monarch, granted this monastery most uncommon privileges; for, by charter under the great seal, he exempted it a *telonis et consuetudine* in every part of England, except London. At Aberbrothick is a chalybeate water, similar to those of Peterhead and Glendyfe.

ABERCONWAY, or CONWAY, Caernarvonshire, North Wales; so called from its situation at the mouth of the river Conway. It is a handsome town, pleasantly situated on the side of a hill, and has many conveniences for trade; notwithstanding which it is the poorest town in the county. It was built by Edward I. and had not only walls, but a strong castle which is now in ruins. Here is an inscription on the tomb of one Nicholas Hooks, importing that he was the one-and-fortieth child of his father, and had twenty-seven children himself. It is 229 miles from London. W. Long. 3. 47. N. Lat. 53. 20.

ABERCROMBY, THE HONOURABLE ALEXANDER (Lord Abercromby), a judge in the courts of session and judiciary in Scotland, was the youngest son of George Abercromby, of Tullibody, Esq. of a respectable family in Clackmannanshire, and was born on the 15th October 1745. Mr Abercromby was early destined for the profession of the law, and with this

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view he was educated at the university of Edinburgh, where he passed through the requisite course of languages, philosophy, and law, and was admitted advocate in the year 1766: but neither during the time of his education, or for some years after he entered his professional career, did he give much promise of those eminent abilities and that assiduous application which afterwards distinguished him as a pleader and a judge. The vivacity of his disposition, and the sprightliness of his manners, led him to prefer the gayer amusements of life, and the society of men of fashion and pleasure, to the arduous prosecution of philosophical studies, and to the less inviting and more barren paths of legal disquisitions. When, however, either during his academical course, or the first years of his practice at the bar, occasions required the exertion of his talents, the quickness of his perception, and the acuteness and strength of his understanding, enabled him to display such powers of attention and application to business as are seldom acquired but by regular and uniform habits of industry, and by the force of constant application. But, to attain that distinction and eminence to which he aspired, and to secure that independence which the patrimony of a younger son of a family, more respectable than opulent, could not afford him, he found it necessary to withdraw from those scenes of amusement and pleasure, and to seclude himself from that society which his gaiety and agreeable manners had enlivened and entertained, and to think seriously of applying to the labours of his profession. With much credit to himself, and with undiminished vigour of mind, he threw off the character of the man of fashion, and devoting his time and talents to the toilsome detail of business as a lawyer, by his successful efforts he soon gave solid proofs of the distinguished abilities which he possessed. About this time, he was engaged as counsel in a cause in which public curiosity and opinion were much interested and divided. This cause, which was of a very intricate nature, afforded an opportunity of making a more eminent display of his professional talents. By a speech which he delivered on this occasion, conspicuous for accurate discrimination, strength of argument, and impressive eloquence, he gave a favourable preface of his future celebrity. The marks of approbation which he now received probably taught him to appreciate those talents which had hitherto remained concealed or unemployed, and encouraged him to call them forth into exertion.

In 1780, Mr Abercromby resigned the office of sheriff-depute of Stirlingshire, which he had held for several years, and accepted of that of depute-advocate, with the hope of extending his employment in the line of his profession. In this step he was not disappointed; for his reputation and business rapidly increased, and soon raised him to the first rank of lawyers at the Scotch bar. In the midst of the laborious duties of his profession, Mr Abercromby did not entirely preclude himself from indulging in the elegant amusements of polite literature. He was one of that society who set on foot two periodical papers, the *Mirror* and *Lounger*, published at Edinburgh; the former in 1779, and the latter in 1785. To the *Mirror* he contributed ten papers, and to the *Lounger* nine. The names of the authors have been published in the late

editions of these works, which renders it unnecessary to point out those papers of which Mr Abercromby was the author.

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In May 1792, he was appointed one of the judges of the court of session, and in December following he was called to a seat in the court of judicatory. Lord Abercromby continued to discharge the arduous duties of these important offices till summer 1795, when he was seized with a pectoral complaint, of which he died on the 17th November the same year, at Exmouth in Devonshire, where he had gone for the recovery of his health.

As a lawyer, Lord Abercromby had acquired great reputation. His papers on law-cases were distinguished for precision and perspicuity. His speeches were elegant, animated, and eloquent. With the most pathetic feeling he pled the cause of the unfortunate; while he could assume the severe tone of virtuous indignation in rebuking injustice and oppression. With such qualifications, added to the strictest attention and punctuality, he could not fail to become an able and respectable judge. In this high station, his deportment was grave, dignified, and decided. His elocution was solemn and deliberate; and his opinions, delivered in this manner, had an impressive effect. Avoiding a detail of circumstances, and never arguing the cause as a lawyer, he pronounced with brevity and precision the opinion of a judge drawn from its striking and prominent features. His only writings are the papers in the periodical publications already alluded to. They are marked by an easy turn of expression, manly and virtuous sentiments, and, when the subject required it, by delicate irony or unaffected tenderness. (*Phil. Transf. Edin.*)

ABERCROMBY, Sir Ralph, knight of the Bath, and a lieutenant-general in the British army, an elder brother of the preceding, was born in the year 1738. Being destined for the army, he obtained, in May 1756, a cornet's commission in the 2d dragoon guards; and rose, April 24. 1762, to the rank of a captain in the 3d regiment of horse. Ascending through the intermediate gradations of rank, he was appointed, November 3. 1781, to the colonelcy of the 103d infantry. September 28. 1787, he was promoted to the rank of major-general. November 5. 1795, he obtained the command of the 7th regiment of dragoons. Having been nearly 40 years in the army, having served with honour in two wars, and being esteemed one of the ablest, coolest, and most intrepid officers in the whole British forces, he was employed on the continent under his royal highness the duke of York, in the commencement of the present war. In the action on the heights of Cateau, he commanded the advanced guard; and was wounded at Nimeguen. He conducted the march of the guards from Deventer to Oldenzaal, in the retreat of the British out of Holland, in the winter of 1794-5. In August 1795, he was appointed to succeed Sir Charles Grey, as commander in chief of the British forces in the West Indies. March 24. 1796, Grenada was suddenly attacked and taken by a detachment of the army under his orders. He afterwards obtained possession of the settlements of Demarara and Ilesquibo, in South America. St Lucia was next taken by more difficult exertions, in which the ability of this eminent commander was signally displayed.

Abercomby played. St Vincent's was, by the middle of June, added to the British conquests. Trinidad, in February 1797, shared the same fate. He returned the same year to Europe, and, in reward for such important services, was invested with the red ribbon, appointed to the command of the regiment of Scots Greys, entrusted with the governments of the Isle of Wight, Fort George, and Fort Augustus, and raised to the high military rank of lieutenant-general. He held, for a time, the chief command of the forces in Ireland. In that command, he laboured to maintain the discipline of the army, to suppress the rising rebellion, and to protect the people from military oppression, with a care worthy alike of the great general and the enlightened and beneficent statesman. From that station he was called to the chief command of the forces in Scotland. His conduct in this distinguished appointment gave universal satisfaction. When the great enterprise against Holland was resolved upon, Sir Ralph Abercromby was called again to command, under his royal highness the duke of York. The difficulties of the ground, the inclemency of the season, delays, though inconvenient, yet unavoidable, the disorderly movements of the Russians, and the timid duplicity of the Dutch, disappointed our hopes of that expedition. But, by the Dutch, the French, the British, it was confessed, that even victory, the most decisive, could not have more conspicuously proved the talents of this illustrious officer. His country applauded the choice, when he was sent with an army to dispossess the French of Egypt. His experience in Holland and Flanders, and in the climate of the West Indies particularly, fitted him for this new command. He accomplished some of the first duties of a general, in carrying his army in health, in spirits, and with the requisite intelligence and supplies, to the destined scene of action. The landing, the first dispositions, the attacks, and the courage opposed to attack, the spirit with which his army appears to have been by confidence in their leader inspired, the extraordinary superiority which the British infantry under his command evinced to that which was thought the bravest and best disciplined infantry in the world, demonstrate that all the best qualities of the greatest commanders were in Sir Ralph Abercromby united—that they were all summed forth into activity, in the glorious achievements amid which he fell.—In his private character he was modest, disinterested, benevolent, and honourable. General Lord Hutchinson, who succeeded him in the command, in the dispatches with the account of his death, has given a fine eulogium on his character as a soldier, and strongly expressive of the high estimation in which he was held by the army.—“We have sustained an irreparable loss in the person of our never sufficiently to be lamented commander in chief, Sir Ralph Abercromby, who was mortally wounded in the action, and died on the 28th of March. I believe he was wounded early, but he concealed his situation from those about him, and continued in the field, giving his orders with that coolness and perspicuity which had ever marked his character, till long after the action was over, when he fainting through weakness and loss of blood. Were it permitted for a soldier to regret any one who has fallen in the service of his country, I might be excused for lamenting him more than any

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other person; but it is some consolation to those who tenderly loved him, that, as his life was honourable, so was his death glorious. His memory will be recorded in the annals of his country—will be sacred to every British soldier—and embalmed in the recollection of a grateful posterity.” His remains were conveyed on board Admiral Lord Keidl's flag ship to Malta, attended by Colonel Sir John Dyer, and were interred in the commandery of the Grand Master, with the highest military honours.

A monument to his memory, to be erected in St Paul's church, London, at the public expence, was voted by the house of commons. His widow has been created a peeress, and a pension of 2000*l.* a-year for her and three lives settled on the family. (*Genl. Mag.*)

ABERDEEN, the name of two cities in Scotland, called the *Old* and *New Town*, situated on the German ocean, in W. Long. 2. 8. and N. Lat. 57. 8.

ABERDEEN, *Old*, is a place of great antiquity. According to tradition, it was of note in the reign of Gregory, who conferred on it some privileges about the year 893. In 1004, Malcolm II. founded a bishopric at a place called Mortlich in Banffshire, in memory of a signal victory which he there gained over the Danes: which bishopric was translated to Old Aberdeen by David I.; and in 1163, the then bishop of Aberdeen obtained a new charter from Malcolm IV. There is extant a charter of Alexander II. by which, in 1217, the king grants to Aberdeen the same privileges he had granted to his town of Perth.

The Old Town lies about a mile to the north of the New, at the mouth of the river Don, over which is a fine Gothic bridge, of a single arch, greatly admired, which rests on a rock on each side. This arch, said to have been built by a bishop of Aberdeen about the year 1290, is 67 feet wide at the bottom, and 34½ feet high above the surface of the river, which at ebb tide is here 19 feet deep. The Old Town was formerly the seat of the bishop, and had a large cathedral commonly called *St Machar's*. Two very antique spires, and one aisle, which is used as a church, are now the only remains of it. The bishopric was founded in the time of David I. as above mentioned. The cathedral had anciently two rows of stone pillars across the church, and three turrets; the steeple, which was the largest of these turrets, rested upon an arch, supported by four pillars. In this cathedral there was a fine library; but about the year 1560, it was almost totally destroyed. But the capital building is the King's College on the south side of the town, which is a large and stately fabric. It is built in form of a square, with cloisters on the south side. The chapel is very ruinous within; but there still remains some wood work of exquisite workmanship. This was preserved by the spirit of the principal at the time of the Reformation, who armed his people and checked the blind zeal of the barons of the Meams; who, after stripping the cathedral of its roof, and robbing it of the bells, were going to violate this seat of learning. They shipped their sacrilegious booty, with an intention of exposing it to sale in Holland: but the vessel had scarcely gone out of port, when it perished in a storm with all its ill-gained lading. The steeple is vaulted with a double cross arch; above which is an imperial crown, supported by eight stone pillars, and closed with a globe and two gilded crosses.

D

Aberdeen.

Aberdeen. crosses. In the year 1631 this steeple was thrown down by a storm, but was soon after rebuilt in a more stately form. This college was founded in 1494, by William Elphinston bishop of this place, lord chancellor of Scotland in the reign of James III. and lord privy seal in that of James IV. But James IV. claimed the patronage of it, and it has since been called the *King's College*. This college, and the Marischal College in the New Town, form one university, called the *University of King Charles*. The library is large, but not remarkable for many curiosities. Hector Boethius was the first principal of the college; and sent for from Paris for that purpose, on an annual salary of forty marks Scots, at thirteen pence each. The square tower on the side of the college was built by contributions from General Monk and the officers under him then quartered at Aberdeen, for the reception of students; of which about a hundred attend the college, many of whom lodge in it.

ABERDEEN, New, is the capital of the shire of Aberdeen. For extent, trade, and beauty, it greatly exceeds any town in the north of Scotland. It is built on a hill or rising ground, and lies on a small bay formed by the Dee, deep enough for a ship of 200 tons, and above two miles in circumference. The buildings (which are of granite from the neighbouring quarries) are generally four stories high; and have, for the most part, gardens behind them, which give it a beautiful appearance. On the high street is a large church which formerly belonged to the Franciscans. This church was begun by Bishop William Elphinston; and finished by Gavin Dunbar, bishop of Aberdeen, about the 1500. Bishop Dunbar is said likewise to have built the bridge over the Dee, which consists of seven arches. In the middle of Castle-street is an octagon building, with neat bas-relievs of the kings of Scotland from James I. to James VII. The town-house makes a good figure, and has a handsome spire in the centre. The grammar school is a low but neat building. Gordon's hospital is handsome; in front is a good statue of the founder: it maintains forty boys, who are apprenticed at proper ages. The infirmary is a large plain building, and sends out between eight and nine hundred cured patients annually. But the chief public building in the New Town is the Marischal College, founded by George Keith earl Marischal, in the year 1593; but since greatly augmented with additional buildings. There are about 140 students belonging to it. In both the Marischal and King's college the languages, mathematics, natural philosophy, divinity, &c. are taught by very able professors. The convents in Aberdeen were: One of Mathurines or of the order of the Trinity, founded by William the Lion, who died in 1214; another of Dominicans, by Alexander II.; a third of Observantines, a building of great length in the middle of the city, founded by the citizens and Mr Richard Vans, &c.; and a fourth of Carmelites, or White Friars, founded by Philip de Arbutnot in 1540.

Aberdeen, including the Old Town, is supposed to contain 25,000 inhabitants. Its trade is considerable, but might be greatly extended by an attention to the white fisheries.

The harbour was long a great detriment to its trade, and occasioned the loss of many lives and much property. A stranger could never depend upon finding it

as he left it; while vessels lay at anchor in the road till the tide should make, they have often been wrecked by storms which suddenly arose. It was very narrow at the mouth, having the easterly rocky point of the Grampian mountains on the south, and a flat blowing sand on the north; extending along the coast for many miles. By the easterly and north-east foms the sand was driven in a long ridge across the harbour's mouth, and formed what was called the *bar*. Upon this bar the depth of water at low tide was sometimes not above three feet. Clearing away the sand, though but a partial and temporary remedy, was a matter of great expence to the community. If it was cleared one week so as to have five or six feet of water at ebb, a fresh storm the next week undid all that had been done. The town at last came to the resolution of erecting a strong pier on the north side of the harbour. This pier is 1200 feet in length, and gradually increases in thickness and height as it approaches to the sea, where the head or rounding is 60 feet diameter at the base, and the perpendicular elevation is 38 feet. The whole is built of granite, which is a very durable stone: many of the outside stones are above three tons weight, with hevn beds. It was built under the direction of Mr Smeaton; and the expence, amounting to above 17,000*l.* is defrayed by doubling the harbour dues, which are chiefly paid by the inhabitants.

A little to the south of the bar, they have now a depth of 17 fathoms at low water; and at the harbour's mouth, from eight to nine fathoms, where they had formerly but a few feet.

Aberdeen once enjoyed a good share of the tobacco trade. At present, its imports are from the Baltic; and a few merchants trade to the West Indies and North America. Its exports are stockings, thread, salmon, and oatmeal. The first is a most important article, as appears by the following state of it: For this manufacture, 20,800*l.* worth of wool is annually imported, and 1600*l.* worth of oil. Of this wool are annually made 69,333 dozen pairs of stockings; worth, at an average, 1*l.* 10*s.* per dozen. These are the work of the country people in almost all parts of this great county, who get 4*s.* per dozen for spinning, and 14*s.* per dozen for knitting; so that there is annually paid them 62,329*l.* 14*s.* There is, besides, about 2000*l.* value of stockings manufactured from the wool of the county. The thread manufacture is another considerable article, though trifling in comparison of the woollen. The salmon fisheries on the Dee and the Don are a good branch of trade. About 46 boats and 130 men are employed on the first; and in some years 167,000*lb.* of fish have been sent pickled to London, and about 930 barrels of salted fish exported to France, Italy, &c.—The fishery on the Don is far less considerable. The fish of this river are taken in cruives above the bridge; a practice contrary to the ancient laws of the kingdom, unless where the nature of the water rendered the net fishery impracticable. The inhabitants likewise export considerable quantities of pickled pork, which they sell to the Dutch for victualling their East India ships and men of war; the Aberdeen pork having the reputation of being the best cured of any in Europe for keeping on long voyages.

“It is however remarkable, Mr Knox observes, that there is not a single docked vessel fitted out from Aberdeen

Aberdeen-shire. Aberdeen for the herring or white fisheries; where is now an excellent harbour, an active people, conversant in trade, and possessed of capital; seated within six hours sailing of Long Fortys, and two days sailing of the Shetland isles. This inattention is the more extraordinary, as the exports of Aberdeen, though very considerable, do not balance the imports in value. The herring and white fisheries, therefore, if prosecuted with vigour, and cured and dried with judgment, would not only extend the scale of exports, but also furnish the outward bound vessels with freights, and better accommodations for the foreign markets. The salmon of the Dee and Don are taken in great abundance, cured in the highest perfection, and greatly valued at the European markets. If the merchants, in addition to these, should also export the cargoes of 50 or 60 vessels constantly employed in the herring and white fisheries, the port of Aberdeen would in a few years become the most celebrated mart of fish now existing."

From a round hill at the west end of the city, flow two springs, one of pure water, and the other of a quality resembling the German Spa. Aberdeen, with Aberbrothick, Brechin, Montrose, and Inverbervy, returns one member to parliament.

ABERDEENSHIRE, an extensive county in Scotland, is bounded on the north and east by the German ocean; on the south by the counties of Kincardine, Angus, and Perth; and on the west by Banff, Murray, and Inverness shires. It extends in length about 90 miles, from south-west to north-east, and about 46 in breadth, from the mouth of the river Dee to where it is bounded by the shire of Banff. Its extent in square miles may be estimated at 1170. It comprehends the districts of Marr, Garioch, Aberdeen Proper, and great part of Buchan. The district of Marr, which may be considered as the centre of Scotland, is wild, rugged, and mountainous; some of the hills rising with precipitous sides, to the height of 2000 feet above the level of the sea. The sides of the hills are covered with extensive natural forests; in many places impenetrable to human footsteps. Buchan is less hilly; but very barren, bleak, and inhospitable to the view. The rest of the country is more fertile, having a gradual descent from the central district eastward, to the sea. The coast is in general very bold and rocky. The Boilers or Bullers of Buchan, arrest the attention of all strangers, by their stupendous craggy precipices. The soil, in so extensive a district, is as various as can be well supposed. The state of agriculture in the interior parishes of the county is very rude; but the example of many patriotic proprietors is producing wonders even in the most barren soils. Prejudices in husbandry, when deeply rooted, are with difficulty overcome; but, even these are yielding to a more regular and modern system. The average produce of the farms in the whole county, is estimated in proportion to the rent, as five to one. This produce, considerable as it is, compared with the produce formerly, is scarcely one-half of what may be expected from the improvements which are daily made. The principal rivers of Aberdeenshire are, the Dee and Don, the Ythan, the Ugie, and the Cruden. The Deveron also forms its boundary with Banffshire for many miles. All these rivers have been long celebrated for the excellence of the salmon with which they abound. The

rents of the fishings are estimated at 2480*l.* *per annum*, **Aberdeen-shire.** and the produce at upwards of 10,000*l.* Besides the fishings of the rivers, the sea coast of Aberdeenshire abounds with all kinds of excellent fish; and a number of fishing vessels are fitted out from the sea ports of the county, particularly Peterhead and Fraserburgh. Under the article of fisheries, we may mention the celebrated pearl fishing in the river Ythan. In this river some pearls have been found, which sold singly so high as 2*l.* and 3*l.* With regard to mineralogy, little wealth of that description has hitherto been found in this county. The granite quarries are the most valuable articles. From those in the neighbourhood of Aberdeen, 12,000 tons and upwards are annually exported to London, the value of which may be estimated at about 8400*l.* There are several quarries in the parish of Aberdour, which yield excellent millstones. There is a quarry of blue slate wrought in the parish of Culsalmond, and a vein of manganese in the neighbourhood of Old Aberdeen. The county abounds with limestone; but, from the want of coal, it cannot be wrought to much advantage, except near a sea port. In Old Machar and Old Deer parishes, about 55,000 bolls of lime are annually burnt, valued at 2750*l.* Some kelp is made on the coast, the value of which must be considerable. Mr Pennant mentions an exceeding large piece of amber, thrown ashore on the coast of Buchan; and smaller pieces are frequently found on the same coast. In the parish of Leslie, a beautiful green amianthus, with white and gray spots, is found in considerable quantities. It is easily wrought, and formed into snuff boxes and other ornaments by the country people. Plumbago is found on the banks of the Deveron. Amethysts, emeralds, and topazes, are found in the parish of Crathie, and on the shore at Peterhead. Onyx and agates are frequently to be met with. On the estate of Invercauld, there are found large specimens of rock crystals. Besides these, asbestos, talc, mica, schistus, and other curious minerals, are found in many parts of the county. The principal manufacture carried on in the county, is the knitting of stockings and hose, in which all the women, and most of the old men and boys, are employed the greater part of the year. The other manufactures are too trifling to deserve particular notice. Aberdeenshire contains three royal boroughs; **ABERDEEN**, **KINTORE**, and **INVERURRY**: and several large and handsome towns; as Peterhead, Fraserburgh, Huntly, and Old Meldrum. It is divided into 85 parishes. Notwithstanding the remote situation of Aberdeenshire, it is ornamented with many fine seats of the nobility and gentry. Slains castle, the seat of the earl of Errol; Aboyne castle, of the earl of Aboyne; Ellon, of the earl of Aberdeen; Inverury, of the earl of Kintore; are the chief residences in the county.

The following account of the population of Aberdeenshire, at two different periods, is taken from the *Statist. Hist. of Scotland*.

| Parish. | Population in 1755. | Population in 1790-98. |
|---|---------------------|------------------------|
| 1 Aberdeen, Old, or Old Machar | 4945 | 8107 |
| Aberdeen, New, including Footdee, or Fittie | 10785 | 16120 |
| Aberdour | 1397 | 1306 |
| D 2 | | Aboyne |

| A B E | | [28] | | A B E | | |
|-----------------|---------------------------------|---------------------|------------------------|------------------|---------------------|------------------------|
| Aberdeen-shire. | Parish. | Population in 1755. | Population in 1790-98. | Parish. | Population in 1755. | Population in 1790-98. |
| | Aboyne | 1695 | 1050 | Peterculter | 755 | 1002 |
| 5 | Alford | 990 | 663 | Peterhead | 2487 | 4100 |
| | Auchindore | 839 | 590 | Pitligo | 1224 | 1300 |
| | Auchterlefs | 1264 | 1264 | 70 Premnay | 448 | 450 |
| | Belhelvie | 1471 | 1318 | Rathen | 1527 | 1730 |
| | Birfe | 1126 | 1300 | Rayne | 1131 | 1173 |
| 10 | Bourty | 525 | 456 | Rhynie and Eflcy | 836 | 681 |
| | Cabrach | 960 | 700 | Skene | 1251 | 1233 |
| | Cairny | 2690 | 2600 | 75 Slains | 1286 | 1117 |
| | Chapel of Garioch | 1351 | 1035 | Strathdon | 1750 | 1524 |
| | Clatt | 559 | 425 | Strichen | 1158 | 1400 |
| 15 | Clunie | 994 | 885 | Tarland | 1300 | 1050 |
| | Goldstone, Logie | 1243 | 1134 | Tarvas | 2346 | 1690 |
| | Coul | 751 | 766 | 80 Tillynefle | 335 | 412 |
| | Crathie and Braemarr | 2671 | 2251 | Tough | 570 | 560 |
| | Crimond | 765 | 917 | Towie | 656 | 550 |
| 20 | Cruden | 2549 | 2028 | Turreff | 1897 | 2029 |
| | Culfa mond | 810 | 745 | Tyrie | 596 | 949 |
| | Culhnie, now annexed to Leochel | | | 85 Udny | 1322 | 1137 |
| | Daviot | 975 | 950 | | | |
| | Deer, New | 2313 | 2800 | | | |
| 25 | Deer, Old | 2813 | 3267 | | | |
| | Drumblade | 1125 | 886 | | | |
| | Drummoak | 760 | 692 | | | |
| | Dyce | 383 | 352 | | | |
| | Echt | 1277 | 963 | | | |
| 30 | Ellon | 2523 | 1830 | | | |
| | Fintray | 905 | 851 | | | |
| | Forbes | 456 | 370 | | | |
| | Forgue | 1802 | 1778 | | | |
| | Foveran | 1981 | 1230 | | | |
| 35 | Fraferburgh | 1682 | 2060 | | | |
| | Fyvie | 2528 | 2194 | | | |
| | Gartley | 1328 | 1800 | | | |
| | Glas | 1093 | 776 | | | |
| | Glenbucket | 430 | 449 | | | |
| 40 | Glenmuiek, &c. | 2270 | 2117 | | | |
| | Huntly | 1900 | 3600 | | | |
| | Insch | 995 | 900 | | | |
| | Inverury | 730 | 732 | | | |
| | Keig | 499 | 475 | | | |
| 45 | Keith-hall | 1111 | 838 | | | |
| | Kennay | 643 | 611 | | | |
| | Kildrummie | 562 | 426 | | | |
| | Kincaidine O'Niel | 1706 | 2075 | | | |
| | King Edward | 1352 | 1577 | | | |
| 50 | Kinnellar | 398 | 342 | | | |
| | Kinnethmont | 791 | 830 | | | |
| | Kintore | 973 | 812 | | | |
| | Leochel, including Culhnie | 1286 | 642 | | | |
| | Leslie | 319 | 418 | | | |
| 55 | Logie Buchan | 575 | 509 | | | |
| | Longside | 1979 | 1792 | | | |
| | Lomnay | 1674 | 1650 | | | |
| | Lumphanan | 682 | 621 | | | |
| | Machar, New | 1191 | 1030 | | | |
| 60 | Meldrum, Old | 1603 | 1490 | | | |
| | Methlick | 1385 | 1035 | | | |
| | Midmarr | 979 | 945 | | | |
| | Montquhitter | 997 | 1500 | | | |
| | Monymusk | 1005 | 1130 | | | |
| 65 | Newhills | 959 | 1181 | | | |
| | Oyne | 643 | 630 | | | |

| A B E | | [28] | | A B E | | |
|-----------------|---------------------------------|---------------------|------------------------|------------------|---------------------|------------------------|
| Aberdeen-shire. | Parish. | Population in 1755. | Population in 1790-98. | Parish. | Population in 1755. | Population in 1790-98. |
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| 5 | Alford | 990 | 663 | Peterhead | 2487 | 4100 |
| | Auchindore | 839 | 590 | Pitligo | 1224 | 1300 |
| | Auchterlefs | 1264 | 1264 | 70 Premnay | 448 | 450 |
| | Belhelvie | 1471 | 1318 | Rathen | 1527 | 1730 |
| | Birfe | 1126 | 1300 | Rayne | 1131 | 1173 |
| 10 | Bourty | 525 | 456 | Rhynie and Eflcy | 836 | 681 |
| | Cabrach | 960 | 700 | Skene | 1251 | 1233 |
| | Cairny | 2690 | 2600 | 75 Slains | 1286 | 1117 |
| | Chapel of Garioch | 1351 | 1035 | Strathdon | 1750 | 1524 |
| | Clatt | 559 | 425 | Strichen | 1158 | 1400 |
| 15 | Clunie | 994 | 885 | Tarland | 1300 | 1050 |
| | Goldstone, Logie | 1243 | 1134 | Tarvas | 2346 | 1690 |
| | Coul | 751 | 766 | 80 Tillynefle | 335 | 412 |
| | Crathie and Braemarr | 2671 | 2251 | Tough | 570 | 560 |
| | Crimond | 765 | 917 | Towie | 656 | 550 |
| 20 | Cruden | 2549 | 2028 | Turreff | 1897 | 2029 |
| | Culfa mond | 810 | 745 | Tyrie | 596 | 949 |
| | Culhnie, now annexed to Leochel | | | 85 Udny | 1322 | 1137 |
| | Daviot | 975 | 950 | | | |
| | Deer, New | 2313 | 2800 | | | |
| 25 | Deer, Old | 2813 | 3267 | | | |
| | Drumblade | 1125 | 886 | | | |
| | Drummoak | 760 | 692 | | | |
| | Dyce | 383 | 352 | | | |
| | Echt | 1277 | 963 | | | |
| 30 | Ellon | 2523 | 1830 | | | |
| | Fintray | 905 | 851 | | | |
| | Forbes | 456 | 370 | | | |
| | Forgue | 1802 | 1778 | | | |
| | Foveran | 1981 | 1230 | | | |
| 35 | Fraferburgh | 1682 | 2060 | | | |
| | Fyvie | 2528 | 2194 | | | |
| | Gartley | 1328 | 1800 | | | |
| | Glas | 1093 | 776 | | | |
| | Glenbucket | 430 | 449 | | | |
| 40 | Glenmuiek, &c. | 2270 | 2117 | | | |
| | Huntly | 1900 | 3600 | | | |
| | Insch | 995 | 900 | | | |
| | Inverury | 730 | 732 | | | |
| | Keig | 499 | 475 | | | |
| 45 | Keith-hall | 1111 | 838 | | | |
| | Kennay | 643 | 611 | | | |
| | Kildrummie | 562 | 426 | | | |
| | Kincaidine O'Niel | 1706 | 2075 | | | |
| | King Edward | 1352 | 1577 | | | |
| 50 | Kinnellar | 398 | 342 | | | |
| | Kinnethmont | 791 | 830 | | | |
| | Kintore | 973 | 812 | | | |
| | Leochel, including Culhnie | 1286 | 642 | | | |
| | Leslie | 319 | 418 | | | |
| 55 | Logie Buchan | 575 | 509 | | | |
| | Longside | 1979 | 1792 | | | |
| | Lomnay | 1674 | 1650 | | | |
| | Lumphanan | 682 | 621 | | | |
| | Machar, New | 1191 | 1030 | | | |
| 60 | Meldrum, Old | 1603 | 1490 | | | |
| | Methlick | 1385 | 1035 | | | |
| | Midmarr | 979 | 945 | | | |
| | Montquhitter | 997 | 1500 | | | |
| | Monymusk | 1005 | 1130 | | | |
| 65 | Newhills | 959 | 1181 | | | |
| | Oyne | 643 | 630 | | | |

Total, 116,836 122,921
 116,836

Increase, 6085

ABERDOUR, a small town in Fifeshire, Scotland, on the frith of Forth, about ten miles north-west of Edinburgh. In old times it belonged to the Viponts; in 1126 it was transferred to the Mortimers by marriage, and afterwards to the Douglasses. William, lord of Liddesdale, surnamed the *Flower of Chivalry*, in the reign of David II. by charter conveyed it to James Douglas, ancestor of the present noble owner the earl of Morton. The monks of Inchoelm had a grant for a burial place here from Allan de Mortimer, in the reign of Alexander III. The nuns, usually styled the *Poor Clares*, had a convent at this place.

ABERFORD, a market town in the west riding of Yorkshire, stands in a bottom; and is about a mile in length, and pretty well built. It is near a Roman road, which is raised very high, and not far from the river Cock; between which and the town there is the foundation of an old castle still visible. It is 18½ miles north-by-west from London. W. Long. 2. 45. N. Lat. 55. 52.

ABERGAVENNY, a large, populous, and flourishing town in Monmouthshire, seated at the confluence of the rivers Ufk and Gavenny. It has a fine bridge over the Ufk, consisting of fifteen arches; and being a great thoroughfare from the west part of Wales to Bath, Bristol, Gloucester, and other places, is well furnished with accommodation for travellers. It is surrounded with a wall, and had once a castle. It carries on a considerable trade in flannels, which are brought hither for sale from the other parts of the county. It is 142 miles distant from London. W. Long. 2. 45. N. Lat. 51. 50. Abergavenny appears to have been the *Gibbanium* of Antoninus, and the town of Ufk his *Burrium*.

ABERNETHY, JOHN, an eminent dissenting minister, was the son of Mr John Abernethy, a dissenting minister in Coleraine, and was born there on the 19th of October 1680. When about nine years of age, he was separated from his parents, his father being obliged

Abernethy liged to attend some public affairs in London; and his mother, to shelter herself from the mad fury of the Irish rebels, retiring to Derry, a relation who had him under his care, having no opportunity of conveying him to her, carried him to Scotland; and thus he escaped the hardships and dangers of the siege of Derry, in which Mrs Abernethy lost all her other children. He afterwards studied at the university of Glasgow, where he remained till he took the degree of master of arts; and, in 1708, he was chosen minister of a dissenting congregation at Antrim, in which situation he continued above 20 years. About the time of the Bangorian controversy (for which see **HOADLEY**), a dissension arose among his brethren in the ministry at Belfast, on the subject of subscription to the Westminster confession of faith. In this controversy he became a leader on the negative side, and incurred the censure of a general synod. The agitation of parties began to be also felt among the members of his congregation. Many of them deserted him; which induced him to accept of an invitation to settle in Dublin, where his preaching was much admired. Here he continued for ten years, respected and esteemed. But his labours were terminated by a sudden attack of the gout in the head, to which he had been subject; and he died in December 1740, in the 60th year of his age. His writings, as was his character, are distinguished for candour, liberality, and manly sentiment. He published a volume of sermons on the Divine Attributes; after his death a second volume was published by his friends; and these were succeeded by four other volumes on different subjects: all of which have been greatly admired.

ABERNETHY, a small town in Strathern, a district of Perthshire in Scotland, situated on the river Tay, a little above the mouth of the Erne. It is said to have been the seat of the Pictish kings; and was afterwards the see of an archbishop, which was afterwards transferred to St Andrew's. In the churchyard of Abernethy, there is a tower of singular construction. It is of a circular form, is 74 feet in height, and 48 feet in circumference. The tower at Brechin is the only one of a similar structure in Scotland. The researches of the antiquarian have hitherto failed in discovering the uses of these insulated buildings. Conjecture, therefore, has supplied the place of certainty, by supposing that they are of Pictish origin, and that they were intended as places of confinement for religious devotees in performing penance, and hence they have been denominated towers of repentance.

ABERRATION, in *Astronomy*, an apparent motion of the celestial bodies, produced by the progressive motion of light, and the earth's annual motion in her orbit.

This effect may be explained and familiarized by the motion of a line parallel to itself, much after the manner that the composition and resolution of forces are explained.

M. de Maupertuis, in his "Elements of Geography," gives a familiar and ingenious idea of the aberration, in this manner: "It is thus," says he, "concerning the direction in which a gun must be pointed to strike a bird in its flight; instead of pointing it straight to the bird, the fowler will point a little before it, in the path of its flight, and that so much the more as the

flight of the bird is more rapid, with respect to the flight of the shot." In this way of considering the matter, the flight of the bird represents the motion of the earth, and the flight of the shot represents the motion of the ray of light.

Mr Clairaut too, in the Mem. de l' Acad. des Sciences for the year 1746, illustrates this effect in a familiar way, by supposing drops of rain to fall rapidly and quickly after each other from a cloud, under which a person moves with a very narrow tube; in which case it is evident that the tube must have a certain inclination, in order that a drop which enters at the top, may fall freely through the axis of the tube, without touching the sides of it; which inclination must be more or less according to the velocity of the drops in respect to that of the tube; then the angle made by the direction of the tube and of the falling drops, is the aberration arising from the combination of those two motions.

This discovery, which is one of the brightest that have been made in the present age, we owe to the accuracy and ingenuity of the late Dr Bradley, astronomer royal; to which he was occasionally led by the result of some observations which he had made with a view to determine the annual parallax of the fixed stars, or that which arises from the motion of the earth in its annual orbit about the sun.

The annual motion of the earth about the sun had been much doubted, and warmly contested. The defenders of that motion, among other proofs of the reality of it, conceived the idea of adducing an incontestable one from the annual parallax of the fixed stars, if the stars should be within such a distance, or if instruments and observations could be made with such accuracy, as to render that parallax sensible. And with this view various attempts have been made. Before the observations of M. Picard, made in 1672, it was the general opinion, that the stars did not change their position during the course of a year. Tycho Brahe and Ricciolus fancied that they had assured themselves of it from their observations; and from hence they concluded that the earth did not move round the sun, and that there was no annual parallax in the fixed stars. M. Picard, in the account of his *Voyage d' Uranibourg*, made in 1672, says that the pole star, at different times of the year, has certain variations, which he had observed for about 10 years, and which amounted to about 40" a year: from whence some, who favoured the annual motion of the earth, were led to conclude that these variations were the effect of the parallax of the earth's orbit. But it was impossible to explain it by that parallax; because this motion was in a manner contrary to what ought to follow only from the motion of the earth in her orbit.

In 1674 Dr Hook published an account of observations which he said he had made in 1669, and by which he had found that the star γ Draconis was 23" more northerly in July than in October: observations which, for the present, seemed to favour the opinion of the earth's motion, although it be now known that there could not be any truth or accuracy in them.

Flamsteed having observed the pole star with his mural quadrant, in 1680 and the following years, found that its declination was 40" less in July than in December; which observations, although very just, were

Aberration. yet, however, improper for proving the annual parallax; and he recommended the making of an instrument of 15 or 20 feet radius, to be firmly fixed on a strong foundation, for deciding a doubt which was otherwise not soon likely to be brought to a conclusion.

In this state of uncertainty and doubt, then, Dr Bradley, in conjunction with Mr Samuel Molineux, in the year 1725, formed the project of verifying, by a series of new observations, those which Dr Hook had communicated to the public almost 50 years before. And as it was his attempt that chiefly gave rise to this, so it was his method in making the observations, in some measure, that they followed; for they made choice of the same star, and their instrument was constructed upon nearly the same principles: but had it not greatly exceeded the former in exactness, they might still have continued in great uncertainty as to the parallax of the fixed stars. For this, and many other convenient and useful astronomical instruments, philosophers are indebted to the ingenuity and accuracy of Mr Graham.

The success of the experiment evidently depending so much on the accuracy of the instrument, this became a leading object of consideration. Mr Molineux's apparatus then having been completed, and fitted for observing, about the end of November 1725, on the third day of December following, the bright star in the head of Draco, marked γ by Bayer, was for the first time observed, as it passed near the zenith, and its situation carefully taken with the instrument. The like observations were made on the fifth, eleventh, and twelfth days of the same month; and there appearing no material difference in the place of the star, a farther repetition of them, at that season, seemed needless, it being a time of the year in which no sensible alteration of parallax, in this star, could soon be expected. It was therefore curiosity that chiefly urged Dr Bradley, who was then at Kew, where the instrument was fixed, to prepare for observing the star again on the 17th of the same month; when, having adjusted the instrument as usual, he perceived that it passed a little more southerly this day than it had done before. Not suspecting any other cause of this appearance, it was ascribed to the uncertainty of the observations, and that either this, or the foregoing, was not so exact as had been supposed. For which reason they proposed to repeat the observation again, to determine from what cause this difference might proceed: and upon doing it, on the 20th of December, the doctor found that the star passed still more southerly than at the preceding observation. This sensible alteration surprised them the more, as it was the contrary way from what it would have been, had it proceeded from an annual parallax of the star. But being now pretty well satisfied, that it could not be entirely owing to the want of accuracy in the observations, and having no notion of any thing else that could cause such an apparent motion as this in the star; they began to suspect that some change in the materials or fabric of the instrument itself, might have occasioned it. Under these uncertainties they remained for some time; but being at length fully convinced, by several trials, of the great exactness of the instrument; and finding, by the gradual increase of the star's distance from the pole, that there must be some regular cause that produced it; they took care to examine very nicely, at the time of

each observation, how much the variation was; till Aberration. about the beginning of March 1726, the star was found to be 20" more southerly than at the time of the first observation: it now indeed seemed to have arrived at its utmost limit southward, as in several trials, made about this time, no sensible difference was observed in its situation. By the middle of April it appeared to be returning back again towards the north; and about the beginning of June, it passed at the same distance from the zenith, as it had done in December, when it was first observed.

From the quick alteration in the declination of the star at this time, increasing about one second in three days, it was conjectured that it would now proceed northward, as it had before gone southward, of its present situation; and it happened accordingly; for the star continued to move northward till September following, when it again became stationary; being then near 20" more northerly than in June, and upwards of 39" more northerly than it had been in March. From September the star again returned towards the south, till, in December, it arrived at the same situation in which it had been observed twelve months before, allowing for the difference of declination on account of the precession of the equinox.

This was a sufficient proof that the instrument had not been the cause of this apparent motion of the star; and yet it seemed difficult to devise one that should be adequate to such an unusual effect. A nutation of the earth's axis was one of the first things that offered itself on this occasion; but it was soon found to be insufficient; for though it might have accounted for the change of declination in γ Draconis, yet it would not at the same time accord with the phenomena observed in the other stars, particularly in a small one almost opposite in right ascension to γ Draconis, and at about the same distance from the north pole of the equator: for though this star seemed to move the same way, as a nutation of the earth's axis would have made it; yet changing its declination but about half as much as γ Draconis in the same time, as appeared on comparing the observations of both made on the same days, at different seasons of the year, this plainly proved that the apparent motion of the star was not occasioned by a real nutation; for had this been the case, the alteration in both stars would have been nearly equal.

The great regularity of the observations left no room to doubt, but that there was some uniform cause by which this unexpected motion was produced, and which did not depend on the uncertainty or variety of the seasons of the year. Upon comparing the observations with each other, it was discovered that, in both the stars above mentioned, the apparent difference of declination from the *maxima*, was always nearly proportional to the versed sine of the sun's distance from the equinoctial points. This was an inducement to think that the cause, whatever it was, had some relation to the sun's situation with respect to those points. But not being able to frame any hypothesis, sufficient to account for all the phenomena, and being very desirous to search a little farther into this matter, Dr Bradley began to think of erecting an instrument for himself at Wanstead; that, having it always at hand, he might with the more ease and certainty inquire into the laws of this new motion. The consideration likewise of

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Aberration. being able, by another instrument, to confirm the truth of the observations hitherto made with that of Mr Molineux, was no small inducement to the undertaking; but the chief of all was, the opportunity he should thereby have of trying in what manner other stars should be affected by the same cause, whatever it might be. For Mr Molineux's instrument being originally designed for observing γ Draconis, to try whether it had any sensible parallax, it was so contrived, as to be capable of but little alteration in its direction; not above seven or eight minutes of a degree: and there being but few stars, within half that distance from the zenith of Kew, bright enough to be well observed, he could not, with his instrument, thoroughly examine how this cause affected stars that were differently situated, with respect to the equinoctial and solstitial points of the ecliptic.

These considerations determined him; and by the contrivance and direction of the same ingenious person, Mr Graham, his instrument was fixed up the 19th of August 1727. As he had no convenient place where he could make use of so long a telescope as Mr Molineux's, he contented himself with one of but little more than half the length, namely of 12 feet and a half, the other being 24 feet and a half long, judging from the experience he had already had, that this radius would be long enough to adjust the instrument to a sufficient degree of exactness: and he had no reason afterwards to change his opinion; for by all his trials he was very well satisfied, that when it was carefully rectified, its situation might be securely depended on to half a second. As the place where his instrument was hung, in some measure determined its radius; so did it also the length of the arc or limb, on which the divisions were made, to adjust it: for the arc could not conveniently be extended farther, than to reach to about $6\frac{1}{2}$ degrees on each side of his zenith. This however was sufficient, as it gave him an opportunity of making choice of several stars, very different both in magnitude and situation; there being more than two hundred, inserted in the British Catalogue, that might be observed with it. He needed not indeed to have extended the limb so far, but that he was willing to take in *Capella*, the only star of the first magnitude that came so near his zenith.

His instrument being fixed, he immediately began to observe such stars as he judged most proper to give him any light into the cause of the motion already mentioned. There was a sufficient variety of small ones, and not less than twelve that he could observe through all seasons of the year, as they were bright enough to be seen in the day time, when nearest the sun. He had not been long observing, before he perceived that the notion they had before entertained, that the stars were farthest north and south when the sun was near the equinoxes, was only true of those stars which are near the solstitial colure. And after continuing his observations a few months, he discovered what he then apprehended to be a general law observed by all the stars, namely, that each of them became stationary, or was farthest north or south, when it passed over his zenith at six of the clock, either in the evening or morning. He perceived also that whatever situation the stars were in, with respect to the cardinal points of the ecliptic, the apparent motion of

every one of them tended the same way, when they *Aberration.* passed his instrument about the same hour of the day or night; for they all moved southward when they passed in the day, and northward when in the night; so that each of them was farthest north when it came in the evening about six of the clock, and farthest south when it came about six in the morning.

Though he afterwards discovered that the maxima, in most of these stars, do not happen exactly when they pass at those hours; yet, not being able at that time to prove the contrary, and supposing that they did, he endeavoured to find out what proportion the greatest alterations of declination, in different stars, bore to each other; it being very evident that they did not all change their declination equally. It has been before noticed, that it appeared from Mr Molineux's observations, that γ Draconis changed its declination above twice as much as the before-mentioned small star that was nearly opposite to it; but examining the matter more nicely, he found that the greatest change in the declination of these stars, was as the sine of the latitude of each star respectively. This led him to suspect that there might be the like proportion between the maxima of other stars; but finding that the observations of some of them would not perfectly correspond with such an hypothesis, and not knowing whether the small difference he met with might not be owing to the uncertainty and error of the observations, he deferred the farther examination into the truth of this hypothesis, till he should be furnished with a series of observations made in all parts of the year; which would enable him not only to determine what errors the observations might be liable to, or how far they might safely be depended on; but also to judge, whether there had been any sensible change in the parts of the instrument itself.

When the year was completed, he began to examine and compare his observations; and having satisfied himself as to the general laws of the phenomena, he then endeavoured to find out the cause of them. He was already convinced that the apparent motion of the stars was not owing to a nutation of the earth's axis. The next that occurred to him, was an alteration in the direction of the plumb-line, by which the instrument was constantly adjusted; but this, upon trial, proved insufficient. Then he considered what refraction might do; but here also he met with no satisfaction. At last, through an amazing sagacity, he conjectured that all the phenomena hitherto mentioned, proceeded from the progressive motion of light, and the earth's annual motion in her orbit: for he perceived, that if light were propagated in time, the apparent place of a fixed object would not be the same when the eye is at rest, as when it is moving in any other direction but that of the line passing through the object and the eye; and that when the eye is moving in different directions, the apparent place of the object would be, different. (*Hutton's Math. Dict.*)

ABERRATION, in *Optics*, the deviation or dispersion of the rays of light, when reflected by a speculum, or refracted by a lens, which prevents them from meeting or uniting in the same point, called the geometrical focus, but are spread over a small space, and produce a confusion of images. There are two species of aberration distinguished by their different causes; the

Aberration the one arises from the figure of the lens or speculum, the other from the unequal refrangibility of the rays of light. This last species is sometimes called the Newtonian, from the name of its discoverer. See OPTICS.

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Abgar.

ABERRATION of the Planets, is equal to the geocentric motion of the planet, the space it appears to move as seen from the earth, during the time that light employs in passing from the planet to the earth. Thus, in the sun, the aberration in longitude is constantly 20", that being the space moved by the sun, or, which is the same thing, by the earth, in the time of 8' 7", which is the time in which light passes from the sun to the earth. In like manner, knowing the distance of any planet from the earth, by proportion it will be, as the distance of the sun is to the distance of the planet, so is 8' 7" to the time of light passing from the planet to the earth: then computing the planet's geocentric motion in this time, that will be the aberration of the planet, whether it be in longitude, latitude, right ascension, or declination. (*Hutton's Math. Dict.*)

ABERYSTWITH, a market-town of Cardiganshire, in Wales, seated on the Ridal, near its confluence with the Istwith, where it falls into the sea. It is a populous, rich town, and has a great trade in lead, and a considerable fishery of whiting, cod, and herrings. It was formerly surrounded with walls, and fortified with a castle; but both are now in ruins. Its distance from London is 203 miles W. N. W. W. Long. 4. 15. N. Lat. 52. 30.

ABESTA, or **AVESTA**, the name of one of the sacred books of the Persian magi, which they ascribe to their great founder Zoroaster. The Avesta is a commentary on two others of their religious books called *Zend* and *Paxend*; the three together including the whole system of the Ignicolæ or worshippers of fire.

ABETTOR, a law term, implying one who encourages another to the performance of some criminal action, or who is art and part in the performance itself. Treason is the only crime in which abettors are excluded by law, every individual concerned being considered as a principal. It is the same with *art-and-part* in the Scots law.

ABEX, a country of Higher Ethiopia, in Africa, bordering on the Red sea, by which it is bounded on the east. It has Nubia or Sennar on the north; Sennar and Abyssinia on the west; and Abyssinia on the south. Its principal towns are Suaquem and Arkeko. It is subject to the Turks, and has the name of the Beglerbeglik of Habelesh. It is about five hundred miles in length and one hundred in breadth, is a mountainous country, sandy, barren, and unhealthy, much infested with wild beasts; and the forests abound with ebony trees.

ABEYANCE, in *Law*, the expectancy of an estate. Thus if lands be leased to one person for life, with reversion to another for years, the remainder for years is in abeyance till the death of the lessee.

ABGAR, or **ABGARUS**, a name given to several of the kings of Edeffa in Syria. The most celebrated of them was one who, it is said, was cotemporary with Jesus Christ; and who having a distemper in his feet, and hearing of Jesus's miraculous cures, requested him by letter to come and cure him. Eusebius*, who believed that this letter was genuine, and also an answer

our Saviour is said to have returned to it, has translated them both from the Syriac, and asserts that they were taken out of the archives of the city of Edeffa. The first is as follows: "Abgarus, prince of Edeffa, to Jesus the holy Saviour, who hath appeared in the flesh in the confines of Jerusalem, greeting. I have heard of thee, and of the cures thou hast wrought without medicines or herbs. For it is reported thou makest the blind to see, the lame to walk, lepers to be clean, devils and unclean spirits to be expelled, such as have been long diseased to be healed, and the dead to be raised; all which when I heard concerning thee, I concluded with myself, That either thou wast a God come down from heaven, or the Son of God sent to do these things. I have therefore written to thee, beseeching thee to vouchsafe to come unto me, and cure my disease. For I have also heard that the Jews use thee ill, and lay snares to destroy thee. I have here a little city, pleasantly situated, and sufficient for us both. **ABGARUS.**" To this letter, Jesus, it is said, returned an answer by Annanias, Abgarus's courier; which was as follows: "Blessed art thou, O Abgarus! who hast believed in me whom thou hast not seen; for the Scriptures say of me, They who have seen me have not believed in me, that they who have not seen me, may, by believing, have life. But whereas thou writest to have me come to thee, it is of necessity that I fulfil all things here for which I am sent; and having finished them, to return to him that sent me: but when I am returned to him, I will then send one of my disciples to thee, who shall cure thy malady, and give life to thee and thine. **JESUS.**" After Jesus's ascension, Judas, who is also named Thomas, sent Thaddeus, one of the seventy, to Abgarus; who preached the gospel to him and his people, cured him of his disorder, and wrought many other miracles: which was done, says Eusebius, A. D. 43.—Though the above letters are acknowledged to be spurious by the candid writers of the church of Rome; several Protestant authors, as Dr Parker, Dr Cave, and Dr Grabe, have maintained that they are genuine, and ought not to be rejected.

Abgarus,
Abians.

ABGILLUS, **JOHN**, surnamed Prester John, was son to a king of the Friscii; and, from the austerity of his life, obtained the name of *Prester*, or Priest. He attended Charlemagne in his expedition to the Holy Land; but instead of returning with that monarch to Europe, it is pretended that he gained mighty conquests, and founded the empire of the Abyssines, called, from his name, the empire of Prester John. He is said to have written the history of Charlemagne's journey into the Holy Land, and his own into the Indies; but they are more probably trifling romances, written in the ages of ignorance.

ABIANS, anciently a people of Thrace, or (according to some authors) of Scythia. They had no fixed habitations; they led a wandering life. Their houses were waggons, which carried all their possessions. They lived on the flesh of their herds and flocks, on milk and cheese, chiefly on that of mare's milk. They were unacquainted with commerce. They only exchanged commodities with their neighbours. They possessed lands, but they did not cultivate them. They assigned their agriculture to any who would undertake it, reserving only to themselves

* Eccl.
Hist. lib. i.
cap. 13.

Abiathar a tribute; which they exacted, not with a view to live in affluence, but merely to enjoy the necessaries of life. They never took arms but to oblige those to make good a promise to them by whom it had been broken. They paid tribute to none of the neighbouring states. They deemed themselves exempt from such an imposition; for they relied on their strength and courage, and consequently thought themselves able to repel any invasion. The Abians, we are told, were a people of great integrity. This honourable eulogium is given them by Homer. (Strabo).

ABIATHAR, high priest of the Jews, son to Ahimelech, who had borne the same office, and received David into his house. This so enraged Saul, who hated David, that he put Ahimelech to death, and 81 priests; Abiathar alone escaped the massacre. He afterwards was high priest; and often gave King David testimonies of his fidelity, particularly during Absalom's conspiracy, at which time Abiathar followed David, and bore away the ark. But after this, conspiring with Adonijah, in order to raise him to the throne of King David his father; this so exasperated Solomon against him, that he divested him of the priesthood, and banished him, A. M. 3021, before Christ 1014.

ABIB, signifying an ear of corn, a name given by the Jews to the first month of their ecclesiastical year, afterwards called *Nisan*. It commenced at the vernal equinox; and according to the course of the moon, by which their months were regulated, answered to the latter part of our March and beginning of April.

ABIDING by WRITINGS, in *Scots Law*: When a person founds upon a writing alleged to be false, he may be obliged to declare judicially, whether he will stand or abide by it as a true deed.

ABIES, the FIR-TREE. See *PIVUS*, *BOTANY Index*.

ABIGEAT, an old law term, denoting the crime of stealing cattle by droves or herds. This crime was severely punished; the delinquent being often condemned to the mines, banishment, and sometimes capitally.

ABIHU, brother to Nadab, and son to Aaron. The two former had the happiness to ascend Mount Sinai with their father, and there to behold the glory of God: but afterward putting strange fire into their censers, instead of the sacred fire commanded by God, fire rushing upon them killed them. Though all the people bewailed this terrible catastrophe, Moses forbade Aaron and his two sons Eleazar and Ithamar to join in the lamentation.

ABII SCYTHÆ, taken by Strabo to denote the European Sarmatæ, bordering on the Thracians and Bastariæ: They were commended by Curtius for their love of justice, and by Ammiesius for their contempt of earthly things.

ABIMELECH, king of Gerar, a country of the Philistines, was cotemporary with Abraham. This patriarch and his family being there, his wife Sarah, though 90 years of age, was not safe in it; for Abimelech carried her off, and was so enamoured of her, that he resolved to marry her. Abraham did not declare himself Sarah's husband; but gave out she was his sister. But the king being warned in a dream, that she was married to a prophet, and that he should die

if he did not restore her to Abraham, the king obeyed; at the same time reproving Abraham for his dissimulation; who thereupon, among other excuses, said she was really his sister, being born of the same father, though of a different mother. Abimelech afterwards gave considerable presents to Abraham; and a covenant, that of Beersheba, was entered into between them, A. M. 2107. After the death of Abraham, there being a famine in the neighbouring countries, Isaac his son also withdrew into Gerar, which was then likewise governed by a king called

ABIMELECH, probably the successor of the former. Here Rebekah's beauty forced her husband to employ Abraham's artifice. Abimelech discovering that they were nearly related, chid Isaac for calling his wife his sister; and at the same time forbade all his subjects, upon pain of death, to do the least injury to Isaac or Rebekah. Isaac's prosperity lost him the king's friendship, and he was desired to go from among them. He obeyed; but Abimelech afterwards entered into a covenant with him, A. M. 2200.

ABIMELECH, the natural son of Gideon, by his concubine. His violent acts and death are recorded in Judges, chap. ix. A. M. 2769.

ABINGDON, a market-town in Berkshire, situated on a branch of the Thames, derives its name from an ancient abbey. The streets, which are well paved, terminate in a spacious area, in which the market is held; and in the centre of this area is the market-house, which is supported on lofty pillars, with a large hall of freestone above, in which the summer assizes for the county are held, and other public business done, the Lent assizes being held at Reading. It has two churches; one dedicated to St Nicholas, and the other to St Helena: the latter is adorned with a spire, and both are said to have been erected by the abbots of Abingdon. Here are also two hospitals, one for six, and the other for thirteen poor men, and as many poor women; a free school; and a charity school. The town was incorporated by Queen Mary. It sends two members to parliament, who are chosen by the inhabitants at large not receiving alms. Its great manufacture is malt, large quantities of which are sent by water to London. It is seven miles south of Oxford, 47 east of Gloucester, and 55 west of London. This town is supposed by Bishop Gibson to be the place called, in the Saxon annals, *Clove/hoo*, where two synods are said to have been held, one in 742, and the other in 822. W. Long. 1. 12. N. Lat. 51. 42.

ABINTESTATE, in *Civil Law*, is applied to a person who inherits the right of one who died intestate or without making a will. See *INTESTATE*.

ABIPONIANS, a tribe of American Indians, who formerly inhabited the district of *Chaks* in Paraguay; but the hostilities of the Spaniards have now obliged them to remove southward into the territory lying between Santa Fe and St Jago. The only account we have of them is that published by M. Dobrizhoffer in 1785. This gentleman, who lived seven years in their country, informs us that they are not numerous, the whole nation not much exceeding 5000; for which he assigns as a reason an unnatural custom among their women of sometimes destroying their own children, from motives of jealousy lest their husbands should take other mates during the long time they give suck,

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which is not less than two years. They are naturally white, but, by exposure to the air and smoke, become of a brown colour. They are a strong and hardy race of people; which our author attributes to their marrying so late, an Abiponian seldom or never thinking of marriage till 30 years of age. They are greatly celebrated on account of their chaffity and other virtues; though, according to our author, they have no knowledge of a Deity. They make frequent incursions into the territories of the Spaniards, mounted on the horses which run wild in those parts. They have a kind of order of chivalry for their warriors; and are so formidable, that 100 of their enemies will fly before ten of these horsemen. The hatred which these savages, whose manners, though rude and uncultivated, are in many respects pure and virtuous, bear to the Spaniards, is invincible. "These pretended Christians," says our author, "who are the scum of the Spanish nation, practise every kind of fraud and villany among these poor barbarians; and their corrupt and vicious morals are so adapted to prejudice the Abiponians against the Christian religion, that the Jesuit missionaries have, by a severe law, prohibited any Spaniard from coming, without a formal permission, into any of their colonies."—From his account of the success of the Jesuits in converting them to Christianity, however, it does not appear that they have been able to do more than bribe them to a compliance with the ceremonies of the Popish superstition; so that in general they are quite ignorant and uncivilized; a most striking instance of which is, that in counting they can go no further than three; and all the art of the Jesuits to teach them the simplest use and expression of numbers has proved unsuccessful.

ABIRAM, a seditious Levite, who, in concert with Korah and Dathan, rebelled against Moses and Aaron, in order to share with them in the government of the people; when Moses ordering them to come with their censers before the altar of the Lord, the earth suddenly opened under their feet, and swallowed up them and their tents; and at the same instant fire came from heaven, and consumed 250 of their followers. Numb. chap. xvi.

ABISHAI, son of Zeruah, and brother to Joab, was one of the celebrated warriors who flourished in the reign of David: he killed with his own hand 300 men, with no other weapon but his lance; and slew a Philistine giant, the iron of whose spear weighed 300 shekels. 1 Sam. chap. xxvi. 2 Sam. chap. xxiii.

ABJURATION, in our ancient customs, implied an oath, taken by a person guilty of felony, and who had fled to a place of sanctuary, whereby he solemnly engaged to leave the kingdom for ever.

ABJURATION, is now used to signify the renouncing, disclaiming, and denying upon oath, the Pretender to have any kind of right to the crown of these kingdoms.

ABJURATION of Heresy, the solemn recantation of any doctrine as false and wicked.

ABLACTATION, or weaning a child from the breast. See WEANING.

ABLACTATION, among the ancient gardeners, the same with what is now called *GRAFTING by approach*, is a method of engraffing, by which the cyon of one tree being for some time united to the stock of another, is afterwards cut off, and, as it were, weaned from the parent tree.

ABLAI, a country of Great Tartary, the inhabitants of which are called *Buchars* or *Buchares*. See ABLAY.

ABLACQUEATION, an old term in *Gardening*, signifies the operations of removing the earth, and barring the roots of trees in winter, to expose them more freely to the air, rain, snows, &c.

ABLANCOURT. See PERROT.

ABLATIVE, in *Grammar*, the sixth case of Latin nouns. The word is formed from *aufferre*, "to take away." Priscian also calls it the *comparative case*; as serving among the Latins, for comparing, as well as taking away.

The ABLATIVE is opposite to the DATIVE; the first expressing the action of taking away, and the latter that of giving.

In English, French, &c. there is no precise mark whereby to distinguish the ablative from other cases; and we only use the term in analogy to the Latin. Thus, in the two phrases, *the magnitude of the city*, and *he spoke much of the city*; we say, that of the city in the first is *genitive*, and in the latter *ablative*; because it would be so, if the two phrases were expressed in Latin.

The question concerning the Greek ablative has been the subject of a famous literary war between two great grammarians, Frischlin and Crusius; the former maintaining, and the latter opposing, the reality of it. The dispute still subsists among their respective followers. The chief reason alleged by the former is, that the Roman writers often joined Greek words with the Latin prepositions which govern ablative cases, as well as with nouns of the same case. To which their opponents answer, that the Latins anciently had no ablative themselves; but instead thereof, made use, like the Greeks, of the dative case; till at length they formed an ablative, governed by prepositions, which were not put before the dative: that, at first, the two cases had always the same termination, as they still have in many instances: but that this was afterwards changed in certain words. It is no wonder then, that the Latins sometimes join prepositions which govern an ablative case, or nouns in the ablative case, with Greek datives, since they were originally the same; and that the Greek dative has the same effect as the Latin ablative.

ABLATIVE ABSOLUTE, in *Grammar*, is a phrase detached or independent of the other parts of a sentence or discourse. In the Latin language it is frequent, and it has been adopted by the moderns.

ABLAY, in *Geography*, a country of Great Tartary, governed by a Calmuck chief, but subject to Russia, to obtain its protection. It lies east of the river Irutsh, and extends 500 leagues along the southern frontiers of Siberia, from E. Long. 72° to 83°. N. Lat. from 51° to 54°.

ABLE, or ABEL, THOMAS, chaplain to Queen Catharine consort to Henry VIII. distinguished himself by his zeal in opposing the proceedings against that unfortunate prince for a divorce. For this purpose he wrote a piece, entitled "*Traſtatus de non diſſolvendo Henrici et Catharine matrimonio*," i. e. "A Treatise proving that the marriage of King Henry and Queen Catharine ought not to be dissolved." But the title of the book, according to Bishop Tanner, was

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Inviſta Veritas. He took the degree of bachelor of arts at Oxford on the 4th of July 1513, and that of maſter of arts on the 27th of July 1516. In 1534 he fell under a proſecution for being concerned in the affair of Elizabeth Barton, called the *Holy Maid of Kent*. This was an infamous impoſtor, ſuborned by the monks to uſe ſtrange geſticulations, exhibit fictitious miracles, and to feign the gift of prophecy; and ſo well did ſhe act her part, that ſhe drew ſome perſons of reſpectability to her intereſt: but being detected, ſhe was condemned and executed, after diſcovering the names of her principal accomplices and inſtigators. On her account Able was charged with miſprifion of treaſon, by ſtat. 25. Hen. VIII; and being alſo one of thoſe who denied the king's ſupremacy over the church, he was apprehended and imprifoned; during which time his confinement was ſo rigorous, that the keeper of Newgate was committed to Marthalea priſon for ſuffering him to go out upon bail. He was afterwards hanged, drawn, and quartered, at Smithfield in 1540. Bouchier gives him the character of a very learned man; and tells us, that he uſed to teach the queen muſic and the learned languages.

ABLECTI, in *Roman Antiquity*, a ſelect body of foldiers choſen from among thoſe called EXTRAORDINARI.

ABLEGMINA, in *Roman Antiquity*, thoſe choice parts of the entrails of victims which were offered in ſacrifice to the gods. They were ſprinkled with flour, and burnt upon the altar; the prieſts pouring ſome wine on them.

ABLOE, in *Geography*, a town of Little Tartary, which lies between the river Dnieper and the Black ſea. E. Long. 33. 15. N. Lat. 46. 20.

ABLUENTS, in *Medicine*, the ſame with diluters or DILUENTS.

ABLUTION, in a general ſenſe, ſignifies the waſhing, or purifying ſomething with water.

ABLUTION, in a religious ſenſe, a ceremony in uſe among the ancients, and ſtill practiſed in ſeveral parts of the world: it conſiſted in waſhing the body, which was always done before ſacrificing, or even entering their houſes. Ablutions appear to be as old as any ceremonies, and external worſhip itſelf. Moſes enjoined them; the heathens adopted them; and Mahomet and his followers have continued them: thus they have got footing among moſt nations, and make a conſiderable part of moſt eſtabliſhed religions.—The Egyptian prieſts had their diurnal and nocturnal ablutions; the Grecians their ſprinklings; the Romans their luſtrations and lavations; the Jews their waſhing of hands and feet, beſide their baptiſms.—The ancient Chriſtians had their ablutions before communion; which the Romiſh church ſtill retain before their maſs, ſometimes after. The Syrians, Copts, &c. have their ſolemn waſhings on Good Friday: the Turks their greater and leſſer ablutions; their Ghaſt and Wodou, their Aman, Taharat, &c.

ABNER, the ſon of Ner, father-in-law to Saul, and general of all his forces, ſerved him on all occaſions with fidelity and courage. After the death of that prince, Abner ſet Iſhbobaſeth, Saul's ſon, on the throne. A war breaking out between the tribe of Judah, who had elected David king, and Iſrael, Abner marched againſt that prince with the flower of his troops, but was defeated. Abner afterward, being diſguiſed,

went over to David, and induced the chiefs of the army and the elders of Iſrael to declare for him. He was received by David with every mark of affection, which gave offence to Joab, by whom he was inſidiouſly put to death, A. M. 2956.

Abnoba
||
Aboccis.

ABNOBA, now ABENOW, in *Geography*, a long range of mountains in Germany, extending from the Rhine to the Necker, and having different names according to the different countries through which they ſtretch. About the river Maine they are called the *Oden* or *Ottenwald*; between Heſſe and Franconia, the *Speſſart*; and about the duchy of Wirtemberg, where the Danube takes its riſe, they receive the name of *Baar*.

ABO, a maritime town in Sweden, ſituated on the promontory formed by the gulfs of Finland and Bothnia, 120 miles north-eaſt from Stockholm, in E. Long. 21. 28. and N. Lat. 60. 10. It is a ſtapelſtad, or city which has the privilege of a foreign trade, and belongs to the *lane* or government and dioceſe of Abo. It is built on both ſides of the river Aurajocki, which have a communication by a wooden bridge. The ſtreets and lanes of Abo amount to 102; the number of houſes to 1100, which in 1780 contained above 2000 families. In 1791 the number of inhabitants was 8500.

A gymnaſium was eſtabliſhed at Abo by Guſtavus Adolphus in 1626, which was converted by Queen Chriſtina, in 1640, into an academy or univerſity, in which are now taught, anatomy, natural hiſtory, chemistry, and economics. The library founded by Queen Chriſtina conſiſts of above 10,000 volumes, beſides manuſcripts, ancient coins, medals, &c. The ſchool of anatomy is in conſiderable repute; and enjoys, it is ſaid, one very extraordinary privilege. By a particular regulation, all perſons who hold lands or penſions from the crown are bound to leave their bodies to be diſſected for the inſtruction of the ſtudents.

The trade of Abo is conſiderable. The exports conſiſt of iron, copper, pitch, tar, deals, &c. The imports are tobacco, coffee, ſugar, wine, ſalt, grain, hemp, and ſpiceries. In Abo are manufactured ſilk ribbands, ſuffian, ſail-cloth, leather, tiles, watches and clocks, paper, ſugar, and tobacco. The plantations of tobacco in this neighbourhood produce not leſs than 152,000 cwt. annually. (*Acerbi's Travels*.)

ABO-HUS, or ABO-SLOT, a very ancient caſtle in Finland, ſituated at the mouth of the river Aura, was the reſidence of Duke John, and the priſon of King Eric in the 16th century. It is at preſent employed as a magazine for corn and gunpowder, and as a priſon for ſtate offenders.

ABOARD, the inſide of a ſhip. Hence any perſon who enters a ſhip is ſaid to *go aboard*: but when an enemy enters in the time of battle, he is ſaid to *board*; a phraſe which always implies hoſtility.—To *fall aboard of*, is to ſtrike or *encounter* another ſhip when one or both are in motion, or to be driven upon a ſhip by the force of the wind or current.—*Aboard-main-tack*, the order to draw the main-tack, i. e. the lower-corner of the main-ſail, down to the CHESS-TREE,

ABOASAR, in *Geography*, a village in Lower Egypt, ſuppoſed to be the ancient Buſiris.

ABOCCIS, in *Ancient Geography*, the Abuncis of Ptolemy, a town of Ethiopia, ſituated on the weſtern ſide of the Nile near the great cataract.

Abacro
||
Abomasus.

ABOCRO, or ABORREL, in *Geography*, a town near the river Ankobar or Cobre, on the African Gold coast. It gives name to a republican province.

ABOLA, in *Geography*, a division of the Agow, in Abyssinia, is a narrow valley, through which runs a river of the same name, whose waters receive many tributary streams from the lofty, rugged, and woody mountains that form the valley. In none of the rivers are any fish found, which Bruce ascribes to their being dried up in the summer, and great rapidity in winter.

ABOLITION, implies the act of annulling, destroying, making void, or reducing to nothing. In our law, it signifies the repealing any law or statute. The leave given by a prince or judge to a criminal accuser to desist from farther prosecution of the accused, is in the most appropriate sense denominated *abolition*.

ABOLITION is particularly used among civilians, for remitting the punishment of a crime. It is, in this sense, a kind of amnesty; the punishment, not the infamy, is taken off.

ABOLITION, in the *Roman Law*, is the annulling a prosecution, or legal accusation: and in this sense, it is different from amnesty; for, in the former, the accusation might be renewed by the same prosecutor, but in the latter, it was extinguished for ever. Within 30 days after a public *abolition*, the same accuser, with the prince's licence, was allowed to renew the charge; after a private *abolition*, another accuser might renew it, but the same could not. *Abolition* was also used for expunging a person's name from the public list of the accused, hung up in the treasury. It was either public, as that under Augustus, when all the names which had long hung up, were expunged at once; or private, when it was done at the motion of one of the parties. *Abolition* of debts, according to the laws of the Theodosian code, was sometimes granted to those who were indebted to the fiscus. A medal of the emperor Adrian represents that prince with a sceptre in his left hand, and a lighted torch in his right, with which he sets fire to several papers in presence of the people, who testify their joy and gratitude by lifting up their hands towards heaven. The legend on the medal is, *Reliqua vetera n. s. nummis abolita*.

ABOLLA, in *Antiquity*, a warm kind of garment, lined or doubled, worn by the Greeks and Romans, chiefly out of the city, in following the camp.—Critics and antiquaries are greatly divided as to the form, use, kinds, &c. of this garment. Papias makes it a species of the *toga*, or gown; but Nonnius, and most others, suppose it to be a species of the *pallium*, or cloak. The *abolla* seems rather to have stood opposed to the *toga*, which was a garment of peace, as the *abolla* was of war; at least Varro and Martial place them in this opposite light. There seem to have been different kinds of *abollæ*, appropriated to different characters and occasions. Even kings appear to have used the *abolla*: Caligula was offended with King Ptolemy for appearing at the shows in a purple *abolla*, the splendour of which drew the eyes of the spectators from the emperor to himself.

ABOMASUS, ABOMASUM, or ABOMASIUS, names of the fourth stomach of ruminating animals. It is in the abomasus of calves and lambs that the runnet or curdling is formed wherewith milk is curdled. See *COMPARATIVE Anatomy*.

Abomina-
tion
||
Aborigines.

ABOMINATION, a term used in Scripture with regard to the Hebrews, who, being shepherds, are said to have been an abomination to the Egyptians, because they sacrificed the sacred animals of that people, as oxen, goats, sheep, &c. which the Egyptians esteemed as abominations, or things unlawful. The term is also applied in the sacred writings to idolatry and idols, because the worship of idols is in itself an abominable thing, and at the same time ceremonies observed by idolaters were always attended with licentiousness and other odious and abominable actions. The *abomination of desolation*, foretold by the prophet Daniel, is supposed to imply the statue of Jupiter Olympius, which Antiochus Epiphanes caused to be placed in the temple of Jerusalem. And the *abomination of desolation*, mentioned by the Evangelists, signifies the ensigns of the Romans, during the last siege of Jerusalem by Titus, on which the figures of their gods and emperors were embroidered, and placed upon the temple after it was taken.

ABON, ABONA, or ABONIS, in *Ancient Geography*, a town and river of Albion. The town, according to Camden, is Abingdon; and the river, Abhon or Avon. But by Antonine's Itinerary, the distance is nine miles from the Venta Silurum, or Caer-Went; others, therefore, take the town to be Porshut, at the mouth of the river Avon, near Bristol. Abhon or Avon, in the Celtic language, denotes a river.

ABORAS, in *Ancient Geography*, by Xenophon called Araxes, a river of Mesopotamia, which flows into the Euphrates at Circesium. In the negotiation between Dioclesian and Narses, near the end of the third century, it was fixed as the boundary between the Roman and Persian empire.

ABORIGINES, in *History*, (Dionysius of Halicarnassus, Livy, Virgil); originally a proper name, given to a certain people in Italy, who inhabited the ancient Latium, or country now called *Campagna di Roma*. In this sense the Aborigines are distinguished from the Janigenæ, who, according to the false Berossus, inhabited the country before them; from the Siculi, whom they expelled; from the Grecians, from whom they descended; from the Latins, whose name they assumed after their union with Æneas and the Trojans; lastly, from the Ausonii, Volsci, Oenotrii, &c. neighbouring nations in other parts of the country. Whence this people came by the appellation is much disputed. St Jerome says, they were so called, as being, *absque origine*, the primitive planters of the country after the flood: Dionysius of Halicarnassus accounts for the name, as denoting them the founders of the race of inhabitants of that country: others think them so called, as being originally Arcadians, who claimed to be earth-born, and not descended from any people. Aurelius Victor suggests another opinion, viz. that they were called *Aborigines*, q. d. *Aberrigines*, from *ab* "from," and *errare* "to wander:" as having been before a wandering people. Pausanias rather thinks they were thus called *απο ορεων*, "from mountains;" which opinion seems confirmed by Virgil, who, speaking of Saturn, the legislator of this people, says,

*Is genus indocile ac dispersum montibus altis
Composuit, legesque dedit.*—

The Aborigines were either the original inhabitants of the country, settled there by Janus, as some imagine;

gine;

Abortion. gine; or by Saturn, or Cham, as others; not long after the dispersion, or even, as some think, before it: Or, they were a colony sent from some other nation; who expelling the Siculi, the ancient inhabitants, settled in their place. About this mother nation there is great dispute. Some maintain it to be the Arcadians, parties of whom were brought into Italy at different times; the first under the conduct of Oenotrius, son of Lycaon, 450 years before the Trojan war; a second from Thessaly; a third under Evander, 60 years before the Trojan war; besides another under Hercules; and another of Lacedemonians, who fled from the severe discipline of Lycurgus: all these uniting, are said to have formed the nation or kingdom of the Aborigines. Others will have them of barbarian rather than Grecian origin, and to have come from Scythia; others from Gaul. Lastly, Others will have them to be Canaanites, expelled by Joshua.

The term *Aborigines*, though so famous in antiquity, is used in modern geography only occasionally as an appellative. It is given to the primitive inhabitants of a country, in contradistinction to colonies, or new races of people.

ABORTION, in *Midwifery*, the premature exclusion of a foetus. See **MIDWIFERY**.

The practice of procuring abortions was prohibited by the ancient Greek legislators Solon and Lycurgus. Whether or not it was permitted among the Romans, has been much disputed. It is certain the practice, which was by them called *visceribus vim inferre*, was frequent enough: but whether there was any penalty on it before the emperors Severus and Antonine, is the question. Nodt maintains the negative; and farther, that those princes only made it criminal in one particular case, viz. of a married woman's practising it out of resentment against her husband, in order to defraud him of the comfort of children: this was ordered to be punished by a temporary exile. The foundation on which the practice is said to have been allowed, was, that the foetus, while *in utero*, was reputed as a part of the mother, ranked as one of her own viscera, over which she had the same power as over the rest: besides, that it was not reputed as a man, *homo*; nor to be alive, otherwise than as a vegetable: consequently, that the crime amounted to little more than that of plucking unripe fruit from the tree. Seneca represents it as a peculiar glory of Helvia, that she had never, like other women, whose chief study is their beauty and shape, destroyed the foetus in her womb. The primitive fathers, Athenagoras, Tertullian, Minutius Felix, Augustin, &c. declaimed loudly against the practice as virtual murder. Several councils have condemned it. Yet we are told that the modern Romish ecclesiastical laws allow of dispensations for it. Egane mentions the rates at which a dispensation for it may be had.

The practice of artificial abortion is chiefly in the hands of women and nurses, rarely in that of physicians; who, in some countries, are not admitted to the profession without abjuring it. Hippocrates, in the oath he would have enjoined on all physicians, includes their not giving the *peffus abortivus*; though elsewhere he gives the formal process whereby he himself procured in a young woman a miscarriage. It may, however, be observed, that often all the powers of art

prove ineffectual, and no less often do the attempts prove the means of punishment by their fatal consequences.

ABORTION, among gardeners, signifies such fruits as are produced too early, and never arrive at maturity.

ABORTIVE, is, in general, applied to whatever comes before its legitimate time, or to any design which miscarries.

ABORTIVE Corn, a distemper of corn mentioned by M. Tillet, and suspected to be occasioned by insects. It appears long before harvest, and may be known by a deformity of the stalk, the leaves, the ear, and even the grain.

ABORTIVE Vellum, is made of the skin of an abortive calf.

ABOTRITES, or **ABODRITES**, in *History*, the name of a people bordering on Bulgaria, in that part of Dacia contiguous to the Danube. The country of the Abodrites, now called Mecklenburg, was a part of the ancient Vandalia.

ABOUKIR, a small town of Egypt, situated in the desert between Alexandria and Rosetta. It is the ancient Canopus, and is situated, according to Mr Savary, six leagues from Pharos. Pliny says, from the testimonies of antiquity, that it was formerly an island: and its local appearance makes this credible; for the grounds around it are so low, that the sea still covered a part of them in the days of Strabo. The town is built upon a rock, which forms a handsome road for shipping, and was out of the reach of inundations. In the bay of Aboukir, a signal victory was obtained in 1798 by the English fleet over the French fleet. The town was taken from the Turks, after a vigorous defence, by the French in 1799, and retaken by the English in 1801.

ABOUT, the situation of a ship immediately after she has tacked, or changed her course by going about and standing on the other tack.—*About ship!* the order to the ship's crew for tacking.

ABOUTIGE, a town of Upper Egypt, in Africa, near the Nile, where they make the best opium in all the Levant. It was formerly a large, but now is a mean place. N. Lat. 26. 50.

ABRA, a silver coin struck in Poland, and worth about one shilling sterling. It is current in several parts of Germany, at Constantinople, Astracan, Smyrna, and Grand Cairo.

ABRABANEL, **ABARBANEL**, or **AVRAVANEL**, **ISAAC**, a celebrated rabbi, descended from King David, and born at Lisbon A. D. 1437. He became counsellor to Alphonso V. king of Portugal, and afterwards to Ferdinand the Catholic; but in 1492 was obliged to leave Spain with the other Jews. In short, after residing at Naples, Corfu, and several other cities, he died at Venice in 1508, aged 71. Abrabanel passed for one of the most learned of the rabbis; and the Jews gave him the names of the Sage, the Prince, and the Great Politician. We have a commentary of his on all the Old Testament, which is pretty scarce: he there principally adheres to the literal sense; and his style is clear, but a little diffuse. His other works are, *A Treatise on the Creation of the World*; in which he refutes Aristotle, who imagined, that the world was eternal: *A Treatise on the Explication of the Prophecies*.

Abortion
||
Abrahamel.

Abacadabra,
bra,
Abraham.

cies relating to the Messiah, against the Christians: A book concerning Articles of Faith; and some others less fought after. Though Abrabanel discovers his implacable aversion to Christianity in all his writings, yet he treated Christians with politeness and good manners in the common affairs of life.

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abracadabra
abracadabr
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a

ABRACADABRA, a magical word, recommended by Serenus Samonicus as an antidote against agues and several other diseases. It was to be written upon a piece of paper as many times as the word contains letters, omitting the last letter of the former every time, as in the margin †, and repeated in the same order; and then suspended about the neck by a linen thread. *Abacadabra* was the name of a god worshipped by the Syrians; so wearing his name was a sort of invocation of his aid; a practice which, though not more useful, yet was less irrational, than is the equally heathenish practice among those who call themselves Christians, of wearing various things, in expectation of their operating by a sympathy, whose parents were Ignorance and Superstition.

ABRAHAM, the father and stock whence the faithful sprung, was the son of Terah. He was descended from Noah by Shem, from whom he was nine degrees removed. Some fix his birth in the 130th year of Terah's age, but others place it in his father's 70th year. It is highly probable he was born in the city of Ur, in Chaldea, which he and his father left when they went to Canaan, where they remained till the death of Terah; after which, Abraham resumed his first design of going to Palestine. The Scriptures mention the several places he stopped at in Canaan; his journey into Egypt, where his wife was carried off from him; his going into Gerar, where Sarah was again taken from him, but restored, as before; the victory he obtained over the four kings who had plundered Sodom; his compliance with his wife, who insisted that he should make use of their maid Hagar in order to raise up children; the covenant God made with him, sealed with the ceremony of circumcision; his obedience to the command of God, who ordered him to offer up his only son as a sacrifice, and how this bloody act was prevented; his marriage with Keturah; his death at the age of 175 years; and his interment in the cave of Machpelah, near the body of Sarah his first wife. It would be of little use to dwell long upon these particulars, since they are so well known. But tradition has supplied numberless others, the mention of one or two of which may not be unacceptable.

Many extraordinary particulars have been told relating to his conversion from idolatry. It is a pretty general opinion, that he sucked in the poison with his milk; that his father made statues, and taught that they were to be worshipped as gods*. Some Jewish authors relate †, that Abraham followed the same trade with Terah for a considerable time. Maimonides ‡ says, that he was bred up in the religion of the Sabæans, who acknowledged no deity but the stars; that his reflections on the nature of the planets, his admiration of their motions, beauty, and order, made him conclude there must be a being superior to the machine of the universe, a being who created and governed it; however, according to an old tradition, he did not renounce Paganism till the 50th year of his age. It is related ||, that his father, being gone a journey,

left him to sell the statues in his absence; and that a man, who pretended to be a purchaser, asked him how old he was: Abraham answered, "Fifty."—"Wretch that thou art (said the other), for adoring at such an age a being which is but a day old!" These words greatly confounded Abraham. Some time afterwards, a woman brought him some flour, that he might give it as an offering to the idols; but Abraham, instead of doing so, took up a hatchet and broke them all to pieces, excepting the largest, into the hand of which he put the weapon. Terah, at his return, asked whence came all this havock? Abraham made answer, that the statues had had a great contest which should eat first of the oblation; "Upon which (said he), the god you see there, being the stoutest, hewed the others to pieces with that hatchet." Terah told him this was bantering; for those idols had not the sense to act in this manner. Abraham retorted these words upon his father against the worshipping of such gods. Terah, stung with this raillery, delivered up his son to the cognizance of Nimrod, the sovereign of the country: who exhorted Abraham to worship the fire; and, upon his refusal, commanded him to be thrown into the midst of the flames: "Now let your God (said he) come and deliver you." But (adds the tradition) Abraham escaped from the flames unhurt.—This tradition is not of modern date, since it is told by St Jerome §; who seems to credit it in general, but disbelieves that part of it which makes Terah so cruel as to be the informer against his own son. Perhaps the ambiguity of the word *Ur** might have given rise to the fiction altogether. Such as lay stress on the following words which God says to Abraham (*Gen. xv. 7.*), *I am the Lord that brought thee out of Ur of the Chaldees*, imagine that he saved him from the great persecution, since he employed the very same words in the beginning of the decalogue to denote the deliverance from Egypt.

Abraham is said to have been well skilled in many sciences, and to have wrote several books. Josephus † tells us that he taught the Egyptians arithmetic and geometry; and, according to Eupolemus and Artapan, he instructed the Phœnicians, as well as the Egyptians, in astronomy. A work which treats of the creation has been long ascribed to him: it is mentioned in the Talmud ‡, and the Rabbis Chanina and Hofchia used to read it on the eve before the Sabbath. In the first ages of Christianity, according to St Epiphanius ||, a heretical sect, called *Setbinians*, dispersed a piece which had the title of *Abraham's Revelation*. Origen mentions also a treatise supposed to be wrote by this patriarch. All the several works which Abraham composed in the plains of Mamre, are said to be contained in the library of the monastery of the Holy Cross on Mount Amaria in Ethiopia §. The book on the creation was printed at Paris 1552, and translated into Latin by Postel: Rittangel, a converted Jew, and professor at Konigsberg, gave also a Latin translation of it, with remarks, in 1642.

ABRAHAM, *Ben Chaila*, a Spanish rabbi, in the 13th century, who professed astrology, and assumed the character of a prophet. He pretended to predict the coming of the Messiah, which was to happen in the year 1358; but fortunately he died in 1303, fifty-five years before the time when the prediction was to be fulfilled.

Abraham.

§ *Tradit. Hebraic. in Genesin.*

* It is the proper name of a city, and it also signifies a fire. The Lat. version Esdras ix. has it thus: *Qui elegisti eum de igne Chaldecorum.*

† *Antiq. lib. i. cap. 7. 8.*

‡ *Heidegger Hist. Patriarch. tom. ii. p. 143.*

§ *Advers. Har. p. 286.*

§ *Kirchem's Treatise of Libraries, p. 142.*

* *Suidas in Egeorum.* See *Jos. xxiv. 2.* † *Apud Genebrand. in Chron.* ‡ *More Necess. c. 29.*

|| *Heidegger, Hist. Patriarch. tom. iii. p. 36.*

Abraham fulfilled. He wrote a book, *De Nativitatibus*, which was printed at Rome in 1545.

ABRAHAM USQUE, a Portuguese Jew, who, in conjunction with Tobias Athias, translated the Hebrew Bible into Spanish. It was printed at Ferrara in 1553, and reprinted in Holland in 1630. This Bible, especially the first edition, which is most valuable, is marked with stars at certain words, which are designed to show that these words are difficult to be understood in the Hebrew, and that they may be used in a different sense.

ABRAHAM, *Nicholas*, a learned Jesuit, born in the diocese of Toul, in Lorraine, in 1589. He obtained the rank of divinity professor in the university of Pont-a-Mousson, which he enjoyed 17 years, and died September 7. 1655. He wrote Notes on Virgil and on Nonnius; A Commentary on some of Cicero's Orationes, in two vols. folio; an excellent collection of theological pieces in folio, entitled *Pharus Veteris Testamenti*; and A Hebrew Grammar in verse.

ABRAHAMITES, an order of monks exterminated for idolatry by Theophilus in the ninth century. Also the name of another sect of heretics who had adopted the errors of Paulus. See PAULICIANS.

ABRANTES, a town of Portugal, in Estremadura, seated on an eminence, in the midst of gardens and olive trees, near the river Tajo, belongs to a marquis of the same name. It contains 35,000 inhabitants, four convents, an alms-house, and an hospital. W. Long. 7. 18. N. Lat. 39. 13.

ABRASAX, or ABRAXAS, the supreme god of the Basilidian heretics. It is a mystical or cabalistic word, composed of the Greek letters $\alpha, \beta, \gamma, \delta, \epsilon, \zeta, \eta, \theta$, which together, according to the Grecian mode of numeration, make up the number 365. For Basilides taught, that there were 365 heavens between the earth and the empyrean; each of which heavens had its angel or intelligence, which created it; each of which angels likewise was created by the angel next above it; thus ascending by a scale to the Supreme being, or first Creator. The Basilidians used the word *Abraxas* by way of charm or amulet.

ABRASION is sometimes used among medical writers for the effect of sharp corrosive medicines or humours in wearing away the natural mucus which covers the membranes, and particularly those of the stomach and intestines. The word is composed of the Latin *ab* and *rado*, to shave or scrape off.

ABRAVANNUS, in *Ancient Geography*, the name of a promontory and river of Galloway in Scotland, so called from the Celtic term *Aber*, signifying either the mouth of a river or the confluence of two rivers, and *Avon*, a river.

ABRAUM, in *Natural History*, a name given by some writers to a species of red clay, used in England by the cabinetmakers, &c. to give a red colour to new mahogany wood. We have it from the isle of Wight; but it is also found in Germany and Italy.

ABRAXAS, an antique stone with the word *abraxas* engraven on it. They are of various sizes, and most of them as old as the third century. They are frequent in the cabinets of the curious; and a collection of them, as complete as possible, has been desired by several. There is a fine one in the abbey of St Genevieve, which has occasioned much speculation. Most of them seem

to have come from Egypt; whence they are of some use for explaining the antiquities of that country. Sometimes they have no other inscription besides the word: but others have the names of saints, angels, or Jehovah himself annexed; though most usually the name of the Basilidian god. Sometimes there is a representation of Isis sitting on a lotus, or Apis surrounded with stars; sometimes monstrous compositions of animals, obscene images, Phalli and Ithyphalli. The graving is rarely good, but the word on the reverse is sometimes said to be in a more modern style than the other. The characters are usually Greek, Hebrew, Coptic, or Etrurian, and sometimes of a mongrel kind, invented, as it would seem, to render their meaning the more inscrutable. It is disputed whether the Veronica of Montreuil, or the granite obelisk mentioned by Gori, be *Abraxases*.

ABREAST (a sea term), side by side, or opposite to; a situation in which two or more ships lie, with their sides parallel to each other, and their heads equally advanced. This term more particularly regards the line of battle at sea, where, on the different occasions of attack, retreat, or pursuit, the several squadrons or divisions of a fleet are obliged to vary their dispositions, and yet maintain a proper regularity by sailing in right or curved lines. When the line is formed abreast, the whole squadron advances uniformly, the ships being equally distant from and parallel to each other, so that the length of each ship forms a right angle with the extent of the squadron or line abreast. The commander in chief is always stationed in the centre, and the second and third in command in the centres of their respective squadrons.—*Abreast*, within the ship, implies on a line with the beam, or by the side of any object aboard; as, the frigate sprung a leak *abreast* of the main hatchway, i. e. on the same line with the main hatchway, crossing the ship's length at right angles, in opposition to AFORE or ABAFT the hatchway.

ABRETTENE, or ABRETTINE, in *Ancient Geography*, a district of Mysia, in Asia. Hence the epithet *Abrettenus* given to Jupiter (Strabo); whose priest was Cleon, formerly at the head of a gang of robbers, and who received many and great favours at the hand of Antony, but afterwards went over to Augustus. The people were called *Abretteni*; inhabiting the country between Ancyra of Phrygia and the river Rhyndacus.

ABRIDGMENT, in *Literature*, a term signifying the reduction of a book into a smaller compass.

The art of conveying much sentiment in few words, is the happiest talent an author can be possessed of. This talent is peculiarly necessary in the present state of literature; for many writers have acquired the dexterity of spreading a few trivial thoughts over several hundred pages. When an author hits upon a thought that pleases him, he is apt to dwell upon it, to view it in different lights, to force it in improperly, or upon the slightest relations. Though this may be pleasant to the writer, it tires and vexes the reader. There is another great source of diffusion in composition. It is a capital object with an author, whatever be the subject, to give vent to all his best thoughts. When he finds a proper place for any of them, he is peculiarly happy. But rather than sacrifice a thought he is fond of, he forces it in by way of digression, or superfluous illustration.

Abreast
||
Abridgement.

illustration. If none of these expedients answer his purpose, he has recourse to the margin, a very convenient apartment for all manner of pedantry and impertinence. There is not an author, however correct, but is more or less faulty in this respect. An abridger, however, is not subject to these temptations. The thoughts are not his own; he views them in a cooler and less affectionate manner; he discovers an impropriety in some, a vanity in others, and a want of utility in many. His business, therefore, is to retrench superfluities, digressions, quotations, pedantry, &c. and to lay before the public only what is really useful. This is by no means an easy employment: To abridge some books, requires talents equal, if not superior, to those of the author. The facts, manner, spirit, and reasoning must be preserved; nothing essential, either in argument or illustration, ought to be omitted. The difficulty of the task is the principal reason why we have so few good abridgments: Wynne's abridgment of Locke's Essay on the Human Understanding, is perhaps the only unexceptionable one in our language.

These observations relate solely to such abridgments as are designed for the public. But,

When a person wants to set down the substance of any book, a shorter and less laborious method may be followed. It would be foreign to our plan to give examples of abridgments for the public: But as it may be useful, especially to young people, to know how to abridge books for their own use, after giving a few directions, we shall exhibit an example or two, to show, with what ease it may be done.

Read the book carefully; endeavour to learn the principal view of the author; attend to the arguments employed: When you have done so, you will generally find, that what the author uses as new or additional arguments, are in reality only collateral ones, or extensions of the principal argument. Take a piece of paper or a common-place book, put down what the author wants to prove, subjoin the argument or arguments, and you have the substance of the book in a few lines. For example,

In the Essay on Miracles, Mr Hume's design is to prove, That miracles which have not been the immediate objects of our senses, cannot reasonably be believed upon the testimony of others.

Now, this argument (for there happens to be but one) is,

"That experience, which in some things is variable, in others uniform, is our *only* guide in reasoning concerning matters of fact. A variable experience gives rise to probability only; an uniform experience amounts to a proof. Our belief of any fact from the testimony of eye witnesses is derived from no other principle than our experience in the veracity of human testimony. If the fact attested be miraculous, here arises a contest of two opposite experiences, or proof against proof. Now, a miracle is a violation of the laws of nature; and as a firm and unalterable experience has established these laws, the proof against a miracle, from the very nature of the fact, is as complete as any argument from experience can possibly be imagined; and if so, it is an undeniable consequence, that it cannot be surmounted by any proof whatever derived from human testimony."

In Dr Campbell's Dissertation on Miracles, the author's principal aim is to show the fallacy of Mr Hume's argument; which he has done most successfully by another single argument, as follows:

"The evidence arising from human testimony is not *solely* derived from experience: on the contrary, testimony hath a natural influence on belief antecedent to experience. The early and unlimited assent given to testimony by children gradually contracts as they advance in life: it is, therefore, more consonant to truth to say, that our *diffidence* in testimony is the result of experience, than that our *faith* in it has this foundation. Besides, the uniformity of experience, in favour of any fact, is not a proof against its being reversed in a particular instance. The evidence arising from the single testimony of a man of known veracity will go farther to establish a belief in its being actually reversed: If his testimony be confirmed by a few others of the same character, we cannot withhold our assent to the truth of it. Now, though the operations of nature are governed by uniform laws, and though we have not the testimony of our senses in favour of any *violation* of them; still, if in particular instances we have the testimony of *thousands* of our fellow-creatures and those too men of strict integrity, swayed by no motives of ambition or interest, and governed by the principles of common sense, That they were actually eye witnesses of these violations, the constitution of our nature obliges us to believe them."

These two examples contain the substance of about 400 pages.—Making private abridgments of this kind has many advantages: it engages us to read with accuracy and attention; it fixes the subject in our minds; and, if we should happen to forget, instead of reading the books again, by glancing a few lines, we are not only in possession of the chief arguments, but recal in a good measure the author's method and manner.

Abridging is peculiarly useful in taking the substance of what is delivered by professors, &c. It is impossible, even with the assistance of short-hand, to take down, *verbatim*, what is said by a public speaker. Besides, although it were practicable, such a talent would be of little use. Every public speaker has circumlocutions, redundancies, lumber, which deserve not to be copied. All that is really useful may be comprehended in a short compass. If the plan of the discourse, and arguments employed in support of the different branches, be taken down, you have the whole. These you may afterwards extend in the form of a discourse dressed in your own language. This would not only be a more rational employment, but would likewise be an excellent method of improving young men in composition; an object too little attended to in all our universities.

"The mode of reducing, says the author of the Curiosities of Literature, what the ancients had written in bulky volumes, practised in preceding centuries, came into general use about the fifth. As the number of students and readers diminished, authors neglected literature, and were disgusted with composition; for to write is seldom done, but when the writer entertains the hope of finding readers. Instead of original authors, there suddenly arose numbers of abridgers. These men, amidst the prevailing disgust

Abrincatarum,
Abrogation.

for literature, imagined they should gratify the public by introducing a mode of reading works in a few hours; which otherwise could not be done in many months; and, observing that the bulky volumes of the ancients lay buried in dust, without any one condescending to examine them, the disagreeable necessity inspired them with an invention that might bring those works and themselves into public notice, by the care they took of renovating them. This they imagined to effect by forming abridgments of these ponderous volumes.

All these Abridgers, however, did not follow the same mode. Some contented themselves with making a mere abridgment of their authors, by employing their own expressions, or by inconsiderable alterations. Others composed those abridgments in drawing them from various authors, but from whose works they only took what appeared to them most worthy of observation, and dressed them in their own style. Others, again, having before them several authors who wrote on the same subject, took passages from each, united them, and thus formed a new work. They executed their design by digesting in common places, and under various titles, the most valuable parts they could collect, from the best authors they read. To these last ingenious scholars, we owe the rescue of many valuable fragments of antiquity. They happily preserved the best maxims, the characters of persons, descriptions, and any other subjects which they found interesting in their studies.

There have been learned men who have censured these Abridgers, as the cause of our having lost so many excellent entire works of the ancients; for posterity becoming less studious, was satisfied with these extracts, and neglected to preserve the originals, whose voluminous size was less attractive. Others on the contrary say, that these Abridgers have not been so prejudicial to literature, as some have imagined; and that had it not been for their care, which snatched many a perishable fragment from that shipwreck of letters, which the barbarians occasioned, we should perhaps have had no works of the ancients remaining.

Abridgers, Compilers, and even Translators, in the present fastidious age, are alike regarded with contempt; yet to form their works with skill requires an exertion of judgment, and frequently of taste, of which their contemners appear to have no conception. It is the great misfortune of such literary labours, that even when performed with ability, the learned will not be found to want them, and the unlearned have not discernment to appreciate them."

ABRINCATARUM OPPIDUM, in *Ancient Geography*, the town of the *Abrincates* or *Abrincatui*; now *Avranche*, in France, situated on an eminence in the south-west of Normandy, near the borders of Brittany, on the English channel. W. Long. 1. 10. N. Lat. 48. 40.

ABROGATION, the act of abolishing a law, by authority of the maker; in which sense the word is synonymous with abolition, repealing, and revocation.

Abrogation stands opposed to *rogation*: it is distinguished from *derogation*, which implies the taking away only some part of a law; from *subrogation*, which denotes the adding a clause to it; from *obrogation*, which implies the limiting or restraining it; from *dispensation*, which only sets it aside in a particular in-

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stance; and from *antiquation*, which is the refusing to pass a law.

ABROKANI, or MALLEMOLLI, a kind of muslin, or clear white fine cotton cloth, brought from the East Indies, particularly from Bengal; being in length 16 French ells and 3 quarters, and in breadth 5 eighths.

ABROLHOS, in *Geography*, dangerous shoals or banks of sand, about 20 leagues from the coast of Brazil. S. Lat. 18. 22. W. Long. 38. 45.

ABROMA, in *Botany*. See *BOTANY Index*.

ABROTANUM, in *Botany*. See *ARTEMISIA, BOTANY Index*.

ABROTONUM, in *Ancient Geography*, a town and harbour on the Mediterranean, in the district of Syrtis Parva, in Africa; one of the three cities that formed Tripoly.

ABRUG-BANYA, in *Geography*, a populous town of Transylvania, in the district of Weissenburg. It is situated in a country which abounds with mines of gold and silver, and is the residence of the mine office, and chief of the metal towns. E. Long. 23. 24. N. Lat. 46. 50.

ABRUS, in *Botany*, the trivial name of the GLYCINE.

ABRUZZO, a province of Naples. The river Pescara divides it into two parts; one of which is called Ulterior, of which *Aquila* is the capital; and the other Citerior, whose capital is *Chieti*. Besides the Apennines, there are two considerable mountains, the one called Monte Cavallo, and the other Monte Majello; the top of which last is always covered with snow. Abruzzo is a cold country; but the rigour of the climate is not so great as to prevent the country from producing in abundance every thing requisite for the support of life. Vegetables, fruits, animals, and numberless other articles of sustenance, not only furnish ample provision for the use of the natives, but also allow of exportation. It produces so much wheat, that many thousands of quarters are annually shipped off. Much Turkey wheat is sent out, and the province of Teramo sends a great deal of rice little inferior in quality to that of Lombardy. Oil is a plentiful commodity, and wines are made for exportation on many parts of the coast; but wool has always been, and still is, their staple commodity: the flocks, after passing the whole summer in the fine pastures of the mountains, are driven for the winter into the warm plains of Puglia, and a few spots near their own coast, where the snow does not lie. There are no manufactures of woollens in the province, except two small ones of coarse cloth. The greatest part of the wool is exported unwrought. No silk is made here, though mulberry trees would grow well in the low grounds.

Formerly the territory of *Aquila* furnished Italy almost exclusively with saffron; but since the culture of that plant has been so much followed in Lombardy, it has fallen to nothing in Abruzzo. In the maritime tracts of country the cultivation of liquorice has been increased of late years, but foreigners export the roots in their natural state: in the province of Teramo there is a manufactory of pottery ware, for which there is a great demand in Germany, by the way of Trieste, as it is remarkably hard and fine; but even this is going

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to

Abrokani
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Abruzzo.

Abruzzo. to decay, by being abandoned entirely to the ignorance of common workmen. It is not to be expected that any improvements will be made in arts and manufactures, where the encouragement and attention of superiors is wanting, and no pains taken to render the commodity more marketable, or to open better channels of sale for it. The only advantages these provinces enjoy, are the gift of benevolent nature; but she has still greater presents in store for them, and waits only for the helping hand of government to produce them. This whole coast, one hundred miles in length, is utterly destitute of sea ports; and the only spots where the produce can be embarked are dangerous inconvenient roads, at the mouths of rivers, and along a lee-shore: the difficulty of procuring shipping, and of loading the goods, frequently causes great quantities of them to rot on hand; which damps industry, and prevents all improvements in agriculture. The husbandman is a poor dispirited wretch, and wretchedness produces emigration: the uneven surface of the country occasions it to be inhabited by retail, if the expression may be used, rather than in large masses; for there is not a city that contains ten thousand people, and few of them exceed three thousand. Villages, castles, and feudatory estates are to be met with in abundance; but the numbers of their inhabitants are to be reckoned by hundreds, not thousands: in a word, the political and social system of the province shows no signs of the vigour which nature so remarkably displays here in all her operations.

The antiquary and the naturalist may travel here with exquisite pleasure and profit; the former will find treasures of inscriptions, and inedited monuments belonging to the warlike nations that once covered the face of the country; the natural philosopher will have a noble field for observation in the stupendous mountains that rise on all sides. Monte-corno and Majello are among the most interesting. The first is like an aged monument of nature, bald, and horribly broken on every aspect: from various appearances, it is evident that its bowels contain many valuable veins of metallic ore; but the great difficulty of access renders the search of them almost impracticable. Majello has other merits, and of a gayer kind:—nature has clothed its declivities and elevated fields with an infinite variety of plants.

The character of the inhabitants varies a little among themselves, according to situation and climate, but essentially from the disposition of the natives of the more southern provinces. This proceeds from a difference of origin: for the Lombards, who were barbarians, but not cruel; poor, but hospitable; endowed with plain honest sense, though possessed of little acuteness or subtlety; remained peaceable proprietors of these mountainous regions, till the Normans, who were accustomed to a similar climate, came and dispossessed them. The Greeks who retained almost every other part of the kingdom under their dominion, never had any sway here. For this reason the Abruzzesi still bear a great resemblance to their northern progenitors or masters: to this day one may trace in them the same goodness of heart, but great indolence and repugnance to lively exertions; a fault that proceeds rather from a want of active virtue, than a disposition to wickedness. Hence it comes, that in these provinces, where the proximity of the frontier almost ensures im-

punity, fewer atrocious and inhuman deeds are heard of than in other parts of the realm. Remnants of ancient northern customs existed here so late as the beginning of this century, and, among the mountaineers, very evident traces of the Frank and Teutonic languages may be discovered.

ABSALOM, in *Scripture History*, the son of David by Maacah, was brother to Tamar, David's daughter, who was ravished by Amnon their eldest brother by another mother. Absalom waited two years for an opportunity of revenging the injury done to his sister: and at last procured the assassination of Amnon at a feast which he had prepared for the king's sons. He took refuge with Talmai king of Gethur; and was no sooner restored to favour, but he engaged the Israelites to revolt from his father. Absalom was defeated in the wood of Ephraim: as he was flying, his hair caught hold of an oak, where he hung till Joab came and thrust him through with three darts: David had expressly ordered his life to be spared, and extremely lamented him. The weight of Absalom's hair, which is stated at "200 shekels after the king's weight," has occasioned much critical discussion. If, according to some, the Jewish shekel of silver was equal to half an ounce avoirdupois, 200 shekels would be $6\frac{1}{2}$ pounds; or, according to Josephus, if the 200 shekels be equal to 5 minæ, and each mina $2\frac{1}{2}$ pounds, the weight of the hair would be $12\frac{1}{2}$ pounds, a supposition not very credible. It has been supposed by others, that the shekel here denotes a weight in gold equal to the value of the silver shekel, or half an ounce, which will reduce the weight of the hair to about 5 ounces; or that the 200 shekels are meant to express the value, not the weight. But it is not improbable, as some have alleged, that the whole difficulty has arisen from an error in transcribing the Hebrew numerals.

ABSCISS, in *Surgery*; from *abscedo*, to separate; a cavity containing pus; or a collection of puriform matter in a part: So called, because the parts which were joined are now separated; one part recedes from another, to make way for the collected matter. See **SURGERY**.

ABSCISSE, in *Conics*, a part of the diameter or transverse axis of a conic section intercepted between the vertex or some other fixed point and a semiordinate. See **CONIC SECTIONS**.

ABSCONSA, a dark lantern used by the monks at the ceremony of burying their dead.

ABSENCE, in *Scots Law*: When a person cited before a court does not appear, and judgment is pronounced, that judgment is said to be *in absence*. No person can be tried criminally in absence.

ABSIMARUS, in *History*, having dethroned Leontius, cut off his nose and ears, and shut him up in a monastery, was proclaimed by the soldiers emperor of the East, A. D. 698. Leontius himself was also an usurper. He had dethroned Justinian II. who, afterwards, with the assistance of the Bulgarians, surprised and took Constantinople and made Absimarus prisoner. Justinian, now settled on the throne, and having both Absimarus and Leontius in his power, loaded them with chains, ordered them to lie down on the ground, and with a barbarous pleasure, held a foot on the neck of each for the space of an hour in presence of the people, who with shouts and exclamations sung, *Super aspi-*

Abfalom
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Absimarus.

Abſinthiated
Absolute.

dem et baſilifcum ambulabis, et conculcabis leonem et draconem. "Thou ſhalt walk on the aſp and the baſilisk, and tread on the lion and the dragon." By the orders of Juſtinian, Abſinarius and Leontius were beheaded, A. D. 705.

ABSINTHIATED, any thing tinged or impregnated with abſinthium or wormwood. Bartholin mentions a woman whoſe milk was become abſinthiated, and rendered as bitter as gall, by the too liberal uſe of wormwood.

Vinum abſinthites, or poculum abſinthiatum, "wormwood wine," is much ſpoken of among the ancients as a wholeſome drink, and even an antidote againſt drunkenneſs. Its medical virtues depend on its aromatic and bitter qualities. Infuſed in wine or ſpirits, it may prove beneficial in caſes of indigeſtion or debility of the ſtomach.

ABSINTHIUM, in *Botany*, the trivial name of the common wormwood. See ARTEMISIA, BOTANY Index.

ABSIS, in *Aſtronomy*, the ſame with apſis. See APSIS.

ABSOLUTE, in a general ſenſe, ſomething that ſtands free or independent.

ABSOLUTE is more particularly underſtood of a being or thing which does not proceed from any cauſe, or does not ſubſiſt by virtue of any other being, conſidered as its cauſe; in which ſenſe, God alone is *absolute*. *Absolute*, in this ſenſe, is ſynonymous with *independent*, and ſtands oppoſed to *dependent*.

ABSOLUTE alſo denotes a thing that is free from conditions or limitations; in which ſenſe, the word is ſynonymous with *unconditional*. We ſay, an *absolute* decree, *absolute* promiſe, *absolute* obedience.

ABSOLUTE Government, that in which the prince is left ſolely to his own will, being not limited to the obſervance of any laws except thoſe of his own diſcretion.

ABSOLUTE Equation, in *Aſtronomy*, is the aggregate of the optic and eccentric equations. The apparent inequality of a planet's motion ariſing from its not being equally diſtant from the earth at all times, is called its optic equation, and would ſubſiſt even if the planet's real motion were uniform. The eccentric inequality is cauſed by the planet's motion being uniform. To illuſtrate which, conceive the ſun to move, or to appear to move, in the circumference of a circle, in whoſe centre the earth is placed. It is manifeſt, that if the ſun moves uniformly in this circle, it muſt appear to move uniformly to a ſpectator on the earth, and in this caſe there will be no optic nor eccentric equation; but ſuppoſe the earth to be placed out of the centre of the circle, and then, though the ſun's motion ſhould be really uniform, it would not appear to be ſo, when ſeen from the earth; and in this caſe there would be an optic equation, without an eccentric one. Imagine farther, the ſun's orbit to be not circular, but elliptic, and the earth in its focus; it will be as evident that the ſun cannot appear to have an uniform motion in ſuch ellipse: ſo that his motion will then be ſubject to two equations, the optic and the eccentric.

ABSOLUTE Number, in *Algebra*, is any pure number ſtanding in any equation without the conjunction of literal characters; as $2x + 36 = 48$; where 36 and 48

are *absolute numbers*, but 2 is not, as being joined with the letter *x*.

ABSOLUTION, in *Civil Law*, is a ſentence whereby the party accuſed is declared innocent of the crime laid to his charge.—Among the Romans, the ordinary method of pronouncing judgment was this: after the cauſe had been pleaded on both ſides, the præco uſed the word *dixerunt*, q. d. they have ſaid what they had to ſay; then three ballots were diſtributed to each judge, marked as mentioned under the article A; and as the majority fell of either mark, the accuſed was *absolved* or condemned, &c. If he were *absolved*, the prætor diſmiſſed him with *videtur non feciſſe*, or *jure videtur feciſſe*.

ABSOLUTION, in the *Canon Law*, is a juridical act, whereby the prieſt declares the ſins of ſuch as are penitent remitted.—The Romaniſts hold abſolution a part of the ſacrament of penance; the council of Trent, ſeſſ. xiv. cap. iii. and that of Florence, in the decree *ad Armenos*, declare the form or eſſence of the ſacrament to lie in the words of *abſolution*, I abſolve thee of thy ſins. The *formula* of abſolution, in the Romiſh church, is *absolute*: in the Greek church, it is deprecatory; and in the churches of the reformed, declarative.

ABSOLUTION is chiefly uſed among Proteſtants for a ſentence by which a perſon who ſtands excommunicated, is releaſed or freed from that puniſhment.

ABSORBENT, in general, any thing poſſeſſing the faculty of *abſorbing*, or ſwallowing up another.

ABSORBENT Medicines, terreſtious powders, or ſubſtances into which calcareous earth enters, as chalk, crabs eyes, &c. which are taken inwardly for drying up or abſorbing any acid or redundant humours in the ſtomach or inteſtines. They are likewiſe applied externally to ulcers or ſores with the ſame intention.

ABSORBENTS, or ABSORBING Veſſels, in *Anatomy*, a name given promiſcuouſly to the lacteal veſſels, lymphatics, and inhalant arteries, a minute kind of veſſels found in animal bodies, which imbibe fluids that come in contact with them. On account of their minuteness and transparency, they eſcape obſervation in ordinary diſſection. They have, however, been detected in every tribe of animals, and, in the animals which have been examined, in every part of the body. Thoſe which open into the ſtomach and inteſtines, and convey the chyle, which is a milky fluid, from theſe organs to the blood, have received the name of *lacteals*, or lacteal veſſels; and thoſe which open on the external ſurface, and the ſurface of all the cavities of the body, have been denominated *lymphatics*, from the lymph or colourleſs fluid which they contain. See ANATOMY.

ABSORBING, the ſwallowing up, ſucking up, or imbibing any thing: thus black bodies are ſaid to *abſorb* the rays of light; luxuriant branches, to *abſorb* or waſte the nutritious juices which ſhould feed the fruit of trees, &c.

ABSORPTION, in the animal economy, is the function of the abſorbent veſſels, or that power by which they take up and propel ſubſtances. This power has been aſcribed to the operation of different cauſes, according to the theories which phyſiologiſts have propoſed. Some attribute it to capillary attraction, others to the preſſure of the atmosphere, and others to

Aborption an ambiguous or unknown cause, which they denominate *fusion*; for this last is nothing else than the elastic power of one part of the air restoring the equilibrium, which has been destroyed by the removal or rarefaction of another part.

Abstemious.

Absorptions of the Earth, a term used by Kircher and others for the sinking in of large tracts of land by means of subterranean commotions, and many other accidents.

Pliny tells us, that in his time the mountain Cymbotus, with the town of Curites, which stood on its side, were wholly absorbed into the earth, so that not the least trace of either remained; and he records the like fate of the city of Tantalus in Magnesia, and after it of the mountain Syphilus, both thus absorbed by a violent opening of the earth. Galanis and Gamales, towns once famous in Phœnicia, are recorded to have met the same fate; and the vast promontory, called *Phegium*, in Ethiopia, after a violent earthquake in the night-time, was not to be seen in the morning, the whole having disappeared, and the earth closed over it. These and many other histories, attested by the authors of greatest credit among the ancients, abundantly prove the fact in the earlier ages; and there have not been wanting too many instances of more modern date. (*Kircher's Mund. Subter.* p. 77.)

Picus, a lofty mountain in one of the Molucca isles, which was seen at a great distance, and served as a land-mark to sailors, was entirely destroyed by an earthquake; and its place is now occupied by a lake, the shores of which correspond exactly to the base of the mountain. In 1556, a similar accident happened in China. A whole province of the mountainous part of the country, with all the inhabitants, sunk in a moment, and was totally swallowed up: The space which was formerly land is also covered with an extensive lake of water. And, during the earthquakes which prevailed in the kingdom of Chili, in the year 1646, several whole mountains of the Andes sunk and disappeared.

ABSORUS, APSORUS, ABSYRTIS, ABSYRTIDES, APSYRTIDES, APSYRTIS, and ABSYRTIUM, (Strabo, Mela, Ptolemy); islands in the Adriatic, in the gulf of Carnero; so called from Absyrtus, Medea's brother, there slain. They are either one island, or two separated by a narrow channel, and joined by a bridge; and are now called *Cherso* and *Osero*.

ABSTEINEN, in *Geography*, a district near the river Memel in Little Lithuania. It is a mountainous country, but is fertile in grain, and abounds with sheep and excellent horses.

ABSTEMII, in *Church History*, a name given to such persons as could not partake of the cup of the eucharist on account of their natural aversion to wine. Calvinists allow these to communicate in the species or bread only, touching the cup with their lip; which, on the other hand, is by the Lutherans deemed a profanation.

ABSTEMIOUS, is properly understood of a person who refrains absolutely from all use of wine.

The history of Mr Wood, in the *Medic. Transf.* vol. ii. p. 261. art. 18. is a very remarkable exemplification of the very beneficial alterations which may be effected on the human body by a strict course of abstemiousness.

The Roman ladies, in the first ages of the republic, were all enjoined to be abstemious; and that it might appear, by their breath, whether or no they kept up to the injunction, it was one of the laws of the Roman civility, that they should kiss their friends and relations whenever they accosted them.

Abstemias
Abstinence.

ABSTEMIUS, LAURENTIUS, a native of Macerata, professor of belles lettres in Urbino, and librarian of Duke Guido Ubaldino, under the pontificate of Alexander VI. He wrote, 1. Notes on most difficult passages of ancient authors. 2. Hecatomythium, i. e. A collection of an hundred fables, &c. which have been often printed with those of Æsop, Phædrus, Gabrius, Avienus, &c. and a preface to the edition of Aurelius Victor published at Venice in 1505.

ABSTERGENT MEDICINES, those employed for resolving obstructions, concretions, &c. such as soap, &c.

ABSTINENCE, in a general sense, the act or habit of refraining from something to which there is a strong propensity. Among the Jews, various kinds of abstinence were ordained by their law. The Pythagoreans, when initiated, were enjoined to abstain from animal food, except the remains of sacrifices; and to drink nothing but water, unless in the evening, when they were permitted to take a small portion of wine. Among the primitive Christians, some denied themselves the use of such meats as were prohibited by that law, others regarded this abstinence with contempt; of which St Paul gives his opinion, Rom. xiv. 1—3. The council of Jerusalem, which was held by the apostles, enjoined the Christian converts to abstain from meats strangled, from blood, from fornication, and from idolatry. Abstinence, as prescribed by the gospel, is intended to mortify and restrain the passions, to humble our vicious natures, and by that means raise our minds to a due sense of devotion. But there is another sort of abstinence, which may be called *ritual*, and consists in abstaining from particular meats at certain times and seasons. It was the spiritual monarchy of the western world which first introduced this ritual abstinence; the rules of which were called *rogations*; but grossly abused from the true nature and design of fasting. In England, abstinence from flesh has been enjoined by statute since the Reformation, particularly on Fridays and Saturdays, on vigils, and on all commonly called *fish days*. The like injunctions were renewed under Queen Elizabeth: but at the same time it was declared, that this was done not out of motives of religion, as if there were any difference in meats; but in favour of the consumption of fish, and to multiply the number of fishermen and mariners, as well as to spare the stock of sheep. The great fast, says St. Augustin, is to abstain from sin.

ABSTINENCE is more particularly used for a spare diet, or a slender parsimonious use of food. Physicians relate wonders of the effects of abstinence in the cure of many disorders, and protracting the term of life. The noble Venetian Cornaro, after all imaginable means had proved vain, so that his life was despaired of at 40, recovered, and lived to near 100, by the mere effect of abstinence; as he himself gives the account. It is indeed surprising to what a great age the primitive Christians of the east, who retired from the persecutions into the deserts of Arabia and Egypt, lived,

Abstinence. ved, healthful and cheerful, on a very little food. Cassian assures us, that the common rate for 24 hours was 12 ounces of bread, and pure water: with such frugal fare St Anthony lived 105 years; James the Hermit, 104; Arsenius, tutor of the emperor Arcadius, 120; St Epiphanius, 115; Simeon the Stylite, 112; and Romauld, 120. Indeed, we can match these instances of longevity at home. Buchanan informs us, that one Laurence arrived at the great age of 140 by force of temperance and labour; and Spottwood mentions one Kentigern, afterwards called St Mongah or Mungo, who lived to 185 by the same means. Abstinence, however, is to be recommended only as it means a proper regimen; for in general it must have bad consequences when observed without a due regard to constitution, age, strength, &c. According to Dr Cheyne, most of the chronical diseases, the infirmities of old age, and the short lives of Englishmen, are owing to repletion; and may be either cured, prevented, or remedied by abstinence; but then the kinds of abstinence which ought to be observed, either in sickness or health, are to be deduced from the laws of diet and regimen.

Among the inferior animals, we see extraordinary instances of long abstinence. The serpent kind, in particular, bear abstinence to a wonderful degree. We have seen rattle-snakes which had lived many months without any food, yet still retained their vigour and fierceness. Dr Shaw speaks of a couple of cerastes (a sort of Egyptian serpents), which had been kept five years in a bottle close corked, without any sort of food, unless a small quantity of sand in which they coiled themselves up in the bottom of the vessel may be reckoned as such: yet when he saw them, they had newly cast their skins, and were as brisk and lively as if just taken. But it is natural for divers species to pass four, five, or six months every year, without either eating or drinking. Accordingly, the tortoise, bear, dormouse, serpent, &c. are observed regularly to retire, at those seasons, to their respective cells, and hide themselves, some in the caverns of rocks or ruins; others dig holes under ground; others get into woods, and lay themselves up in the clefts of trees; others bury themselves under water, &c. And these animals are found as fat and fleshy, after some months abstinence, as before.—Sir G. Ent* weighed his tortoise several years successively, at its going to earth in October, and coming out again in March; and found, that of four pounds four ounces, it only used to lose about one ounce. Indeed we have instances of men passing several months as strictly abstinent as other creatures. In particular, the records of the Tower mention a Scotchman imprisoned for felony, and strictly watched in that fortress for six weeks, during which time he did not take the least sustenance; and on this account he obtained his pardon. Numberless instances of extraordinary abstinence, particularly from morbid causes, are to be found in the different periodical Memoirs, Transactions, Ephemerides, &c. It is to be added, that, in most instances of extraordinary human abstinence related by naturalists, there were said to have been apparent marks of a texture of blood and humours, much like that of the animals above mentioned. Though it is no improbable opinion, that the air itself may furnish something for nutrition, it is certain, there are sub-

stances of all kinds, animal, vegetable, &c. floating in the atmosphere, which must be continually taken in by respiration; and that an animal body may be nourished thereby, is evident in the instance of vipers; which if taken when first brought forth, and kept from every thing but air, will yet grow very considerably in a few days. So the eggs of lizards are observed to increase in bulk, after they are produced, though there be nothing to furnish the increment but air alone; in like manner as the eggs or spawn of fishes grow and are nourished with the water. And hence, say some, it is that cooks, turnspit dogs, &c. though they eat but little, yet are usually fat. See *FASTING*.

ABSTINENTS, or *ABSTINENTES*, a set of heretics that appeared in France and Spain about the end of the third century. They are supposed to have borrowed part of their opinions from the Gnostics and Manicheans, because they opposed marriage, condemned the use of flesh meat, and placed the Holy Ghost in the class of created beings. We have, however, no certain account of their peculiar tenets.

ABSTRACT, in a general sense, any thing separated from something else.

ABSTRACT Idea, in *Metaphysics*, is a partial idea of a complex object, limited to one or more of the component parts or properties, laying aside or abstracting from the rest. Thus, in viewing an object with the eye, or recollecting it in the mind, we can easily abstract from some of its parts or properties, and attach ourselves to others: we can attend to the redness of a cherry, without regard to its figure, taste, or consistence. See *ABSTRACTION*.

ABSTRACT Mathematics, otherwise called *Pure Mathematics*, is that which treats of magnitude or quantity, absolutely and generally considered, without restriction to any species of particular magnitude; such are Arithmetic and Geometry. In this sense, abstract mathematics is opposed to mixed mathematics; wherein simple and abstract properties, and the relations of quantities primitively considered in pure mathematics, are applied to sensible objects, and by that means become intermixed with physical considerations: such are Hydrostatics, Optics, Navigation, &c.

ABSTRACT Numbers, are assemblages of units, considered in themselves without denoting any particular and determinate things. Thus 6 is an abstract number, when not applied to any thing; but if we say 6 feet, 6 becomes a concrete number. See the article *NUMBER*.

ABSTRACT Terms, words that are used to express abstract ideas. Thus *beauty, ugliness, whiteness, roundness, life, death*, are abstract terms.

ABSTRACT, in *Literature*, a compendious view of any large work; shorter and more superficial than an abridgment.

ABSTRACTION, in general, the art of abstracting, or the state of being abstracted.

ABSTRACTION, in *Metaphysics*, the operation of the mind when occupied by abstract ideas. A large oak fixes our attention, and abstracts us from the shrubs that surround it. In the same manner, a beautiful woman in a crowd, abstracts our thoughts, and engrosses our attention solely to herself. These are examples of real abstraction: when these, or any others of a similar kind, are recalled to the mind after the objects themselves

Abstinents
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Abstraction.

Abstruse
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Absyrtus.

themselves are removed from our sight, they form what is called *abstract ideas*, or the mind is said to be employed in abstract ideas. But the power of abstraction is not confined to objects that are separable in reality as well as mentally: the size, the figure, the colour of a tree are inseparably connected, and cannot exist independent of each other; and yet we can mentally confine our observations to any one of these properties, neglecting or abstracting from the rest.

Abstraction is chiefly employed these three ways. First, When the mind considers any one part of a thing, in some respect distinct from the whole; as a man's arm, without the consideration of the rest of the body. Secondly, When we consider the *mode* of any substance, omitting the substance itself; or when we separately consider several modes which subsist together in one subject. This abstraction the geometricians make use of when they consider the length of a body separately, which they call a *line*, omitting the consideration of its breadth and thickness. Thirdly, It is by abstraction that the mind forms general or universal ideas: omitting the modes and relations of the particular objects whence they are formed. Thus, when we would understand a thinking being in general, we gather from our self-consciousness what it is to think; and omitting those things which have a particular relation to our own minds, or to the human mind, we conceive a thinking being in general.

Ideas formed in this manner, which are what we properly call *abstract ideas*, become general representatives of all objects of the same kind; and their names applicable to whatever exists conformable to such ideas. Thus the idea of colour that we receive from chalk, snow, milk, &c. is a representative of all of that kind; and has a name given it, *whiteness*, which signifies the same quality wherever found or imagined.

ABSTRUSE, something deep, hidden, concealed, or far removed from common apprehensions, and therefore not easily understood; in opposition to what is obvious and palpable. Thus metaphysics is an abstruse science; and the doctrine of fluxions, and the method *de maximis et minimis*, are abstruse points of knowledge.

ABSURD, an epithet applied to any thing that is contrary to human apprehension, and contradicts a manifest truth. Thus, it would be absurd to say that 6 and 6 make only 10, or to deny that twice 6 make 12. When the term *absurd* is applied to actions, it has the same import as *ridiculous*.

ABSURDUM, *reductio ad absurdum*, is a mode of demonstration employed by mathematicians when they prove the truth of a proposition by demonstrating that the contrary is impossible, or leads to an absurdity. It is in this manner that Euclid demonstrates the fourth proposition of the first book of the Elements, by showing that the contrary involves a manifest absurdity, viz. "*That two straight lines can inclose a space.*"

ABSINTHIUM. See ARTEMISIA, BOTANY-Index.

ABSYRTUS, in *Heathen Mythology*, the son of Ætes and Hypsea, and the brother of Medea. The latter running away with Jason, after her having assisted him in carrying off the golden fleece, was pursued by her father; when, to stop his progress, she tore Absyrtus in pieces, and scattered his limbs in his way.

ABTHANES, in *History*, a title of honour used by the ancient inhabitants of Scotland, who called their nobles *thanes*, which in the old Saxon signifies *king's ministers*; and of these the higher rank were styled *abthanes*, and those of the lower *underthanes*.

Abthanes,
Abubeker.

ABUBEKER, or ABU-BECC, the first caliph, the immediate successor of Mahomet, and one of his first converts. His original name was Abdulcaaba, signifying, *servant of the caaba* or *temple*, which, after his conversion to Mahometanism, was changed to Abdallah, *servant of God*; and on the marriage of the prophet with his daughter Ayesha, he received the appellation of Abu-Becc, *Father of the virgin*. Illustrious by his family, and possessed of immense wealth, his influence and example were powerful means of propagating the faith he had adopted, and in gaining converts to the new religion. Abubeker was a sound believer, and although he lived in the greatest familiarity with Mahomet, he had always the highest veneration for his character. He vouched for the truth of his revelations after his nightly visits to heaven, and thus obtained the appellation of the *faithful*. He was employed in every mission of trust or importance, was the constant friend of the prophet, and when he was forced to fly from Mecca, was his only companion. But notwithstanding his blind devotion to Mahometanism, his moderation and prudence were conspicuous in checking the fanatical zeal of the disciples of the new religion, on the death of Mahomet. This event threatened destruction to the doctrines of Islamism. Its followers could not doubt that it had taken place, and they were afraid to believe it. In this uncertainty and fluctuation of belief, Omar drew his sword, and threatened to cut in pieces all who dared to assert that the prophet was dead. Abubeker, with more coolness and wisdom, addressed the people, *Is it, says he, Mahomet whom you adore, or the God whom he has revealed to you? Know that this God is alone immortal, and that all those whom he has created are subject to death.* Appeased and reconciled by this speech, they elected him successor to Mahomet, and he assumed the modest title of caliph, which has continued with all his successors. Ali, the son-in-law of the prophet, regarding the elevation of Abubeker as a violation of his legal rights to the succession, refused at first to recognise the appointment, till he was forced by threats into compliance and submission. His partisans, however, still considered him as the legitimate successor, and their opinion has prevailed among many Mussulmans, who believe that the sovereign authority, both spiritual and temporal, remains with his descendants.

The first part of the reign of Abubeker was unsettled and turbulent. Many of his subjects returned to idolatry, some embraced Christianity, new impostors arose. Seduced by the example of Mahomet, they were dazzled with the hope of power and distinction, and were thus led on to destruction. He alone was received as the true prophet, all others were false. Abubeker, with the assistance of Caled, an able general, soon reduced to submission and obedience, or punished with death, all those who disputed or resisted his authority. Tranquillity being established at home, he sent out his armies, under the same general, to propagate the Mahometan faith in Syria, which, after a bloody battle, was compelled to submit to a new power, and to adopt a new religion. Damascus was afterwards besieged; and

Abucco
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Abundant.

and on the very day that it surrendered and opened its gates to his victorious arms, Abubeker expired, in the 13th year of the Hegira.

The public conduct of this caliph was marked by prudence, equity, and moderation. Mild and simple in his manners, frugal in his fare, he discovered great indifference to riches and honours. Such was his liberality to the poor and to his soldiers, that he bestowed on them the whole of his revenue. The treasury being on this account quite exhausted at his death, made Omar say, "that he had left a difficult example for his successors to follow." A short time before his death, he dictated his will in the following words: "This is the will of Abubeker, which he dictated at the moment of his departure from this world: At this moment when the infidel shall believe, when the impious shall no longer doubt, and liars shall speak truth, I name Omar for my successor. Mussulmans, hear his voice, and obey his commands. If he rule justly, he will confirm the good opinion which I have conceived of him; but if he deviate from the paths of equity, he must render an account before the tribunal of the sovereign judge. My thoughts are upright, but I cannot see into futurity. In a word, they who do evil, shall not always escape with impunity." Abubeker first collected and digested the revelations of Mahomet, which had hitherto been preserved in detached fragments, or in the memories of the Mussulman believers; and to this the Arabians gave the appellation *Almoshaf*, or the Book. The first copy was deposited in the hands of Hafessa, the daughter of Omar and the widow of Mahomet.

ABUCCO, АВОЦКО, or АВОСНИ, a weight used in the kingdom of Pegu. One abucco contains $12\frac{1}{2}$ teccalis; two abuccos make a *giro* or *agire*; two *giri*, half a *biza*; and a *biza* weighs an hundred teccalis; that is, two pounds five ounces the heavy weight, or three pounds nine ounces the light weight of Venice.

ABUKESO, in *Commerce*, the same with ASLAN.

ABULFARAGIUS, GREGORY, son of Aaron a physician, born in 1226, in the city of Malatia, near the source of the Euphrates in Armenia. He followed the profession of his father; and practised with great success: but he acquired a higher reputation by the study of the Greek, Syriac, and Arabic languages, as well as by his knowledge of philosophy and divinity; and he wrote a history which does great honour to his memory. It is written in Arabic, and divided into dynasties. It consists of ten parts, being an epitome of universal history from the creation of the world to his own time. The parts of it relating to the Saracens, Tartar Moguls, and the conquests of Jenghis Khan, are esteemed the most valuable. He professed Christianity, and was bishop of Aleppo, and is supposed to have belonged to the sect of the Jacobites. His contemporaries speak of him in a strain of most extravagant panegyric. He is styled the *king of the learned*, the *pattern of his times*, the *phoenix of the age*, and the *crown of the virtuous*. Dr Pococke published his history with a Latin translation in 1663; and added, by way of supplement, a short continuation relating to the history of the eastern princes.

ABUNA, the title given to the archbishop or metropolitan of Abyssinia.

ABUNDANT NUMBER, in *Arithmetic*, is a num-

ber, the sum of whose aliquot parts is greater than the number itself. Thus the aliquot parts of 12, being 1, 2, 3, 4, and 6, they make, when added together, 16. An abundant number is opposed to a *deficient* number, or that which is greater than all its aliquot parts taken together; as 14, whose aliquot parts are 1, 2, and 7, which makes no more than 10: and to a *perfect* number, or one to which its aliquot parts are equal, as 6, whose aliquot parts are 1, 2, and 3.

ABUNDANTIA, a heathen divinity, represented in ancient monuments under the figure of a woman with a pleasing aspect, crowned with garlands of flowers, pouring all sorts of fruit out of a horn which she holds in her right hand, and scattering grain with her left, taken promiscuously from a sheaf of corn. On a medal of Trajan she is represented with two cornucopiæ.

ABUSAID, EBN ALJAPTU, sultan of the Moguls, succeeded his father, anno 717 of the Hegira. He was the last monarch of the race of Jenghis Khan, who held the undivided empire of the Moguls; for after his death, which happened the same year that Tamerlane was born, it became a scene of blood and desolation, and was broken into separate sovereignties.

ABUS, in *Ancient Geography*, a river of Britain, formed by the confluence of the Ure, the Derwent, Trent, &c. falling into the German sea, between Yorkshire and Lincolnshire, and forming the mouth of the Humber.

ABUSE, an irregular use of a thing, or the introducing something contrary to the true intention thereof. In grammar, to apply a word *abusively*, or in an *abusive* sense, is to misapply or pervert its meaning.—A permutation of benefices, without the consent of the bishop, is termed *abusive*, and consequently null.

ABUTILON, in *Botany*, the trivial name of several species of the fida. See СИДА, BOTANY Index.

ABYDOS, in *Ancient Geography*, an inland town of Egypt, between Ptolemais and Diospolis Parva, towards Syene; famous for the palace of Memnon and the temple of Osiris. A colony of Milesians; (Stephanus). Abydos lay midway between Lampfacus and Ilium, famous for Xerxes's bridge, (Herodotus, Virgil); and for the loves of Leander and Hero, (Musaëus, Ovid); celebrated also for its oysters (Ennius, Virgil). The inhabitants were a soft effeminate people, given much to detraction; hence the proverb, *Ne temere Abydum calcare*, when we would caution against danger, (Stephanus).

ABYDOS, in *Ancient Geography*, an inland town of Egypt, between Ptolemais and Diospolis Parva, towards Syene; famous for the palace of Memnon and the temple of Osiris. A colony of Milesians; (Stephanus). It was the only one in the country into which the fingers and dancers were forbidden to enter.

The city, reduced to a village under the empire of Augustus, now presents to our view only a heap of ruins without inhabitants; but to the west of these ruins is still found the celebrated tomb of Ofymandes. The entrance is under a portico 60 feet high, and supported by two rows of massy columns. The immovable solidity of the edifice, the huge masses which compose it, the hieroglyphics it is loaded with, stamp it a work of the ancient Egyptians. Beyond it is a temple 300 feet long and 145 wide. Upon entering the monument we meet with an immense hail, the roof of which

Abundantia
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Abydos.

Abyla.

which is supported by 28 columns 60 feet high, and 19 in circumference at the base. They are 12 feet distant from each other. The enormous stones that form the ceiling, perfectly joined and incrustated, as it were, one in the other, offer to the eye nothing but one solid platform of marble 126 feet long and 26 wide. The walls are covered with hieroglyphics. One sees there a multitude of animals, birds, and human figures with pointed caps on their heads, and a piece of stuff hanging down behind, dressed in loose robes that come down only to the waist. The sculpture, however, is clumsy; the forms of the body, the attitudes and proportions of the members, ill observed. Amongst these we may distinguish some women suckling their children, and men presenting offerings to them. Here also we meet with the divinities of India. Monsieur Chevalier, formerly governor of Chandernagore, who resided 20 years in that country, carefully visited this monument on his return from Bengal. He remarked here the gods *Jag-grenate*, *Gones*, and *Vechnou* or *Wislnou*, such as they are represented in the temples of Indostan. A great gate opens at the bottom of the first hall, which leads to an apartment 46 feet long by 22 wide. Six square pillars support the roof of it; and at the angles are the doors of four other chambers, but so choked up with rubbish that they cannot now be entered. The last hall, 64 feet long by 24 wide, has stairs by which one descends into the subterraneous apartments of this grand edifice. The Arabs, in searching after treasure, have piled up heaps of earth and rubbish. In the part we are able to penetrate, sculpture, and hieroglyphics are discoverable as in the upper story. The natives say that they correspond exactly with those above ground, and that the columns are as deep in the earth as their height above the surface. It would be dangerous to go far into those vaults; for the air of them is so loaded with a mephitic vapour, that a candle can scarce be kept burning in them. Six lions heads, placed on the two sides of the temple, serve as spouts to carry off the water. You mount to the top by a staircase of a very singular structure. It is built with stones incrustated in the wall, and projecting six feet out; so that being supported only at one end, they appear to be suspended in the air. The walls, the roof, and the columns of this edifice, have suffered nothing from the injuries of time; and did not the hieroglyphics, by being corroded in some places, mark its antiquity, it would appear to have been newly built. The solidity is such, that unless people make a point of destroying it, the building must last a great number of ages. Except the colossal figures, whose heads serve as an ornament to the capitals of the columns, and which are sculptured *in relievo*, the rest of the hieroglyphics which cover the inside are carved in stone. To the left of this great building we meet with another much smaller, at the bottom of which is a sort of altar. This was probably the sanctuary of the temple of Osiris.

ABYLA (Ptolemy, Mela); one of Hercules's pillars, on the African side, called by the Spaniards *Sierra de las Monas*, opposite to Calpe in Spain, the other pillar; supposed to have been formerly joined, but separated by Hercules, and thus to have given entrance to the sea now called the *Mediterranean*; the limits of the labours of Hercules (Pliny).

ABYSS, in a general sense, denotes something pro-

found, and, as it were, bottomless. The word is originally Greek, *αβυσσος*; compounded of the privative *α*, and *βυσσοσ*, *q. d.* without a bottom.

ABYSS, in a more particular sense, denotes a deep mass or fund of waters. In this sense, the word is particularly used in the Septuagint, for the water which God created at the beginning with the earth, which encompassed it round, and which our translators render by *deep*. Thus it is that darkness is said to have been on the face of the abyss.

ABYSS is also used for an immense cavern in the earth, in which God is supposed to have collected all those waters on the third day; which, in our version, is rendered the *seas*, and elsewhere the *great deep*. Dr Woodward, in his Natural History of the Earth, asserts, That there is a mighty collection of waters enclosed in the bowels of the earth, constituting a huge orb in the interior or central parts of it; and over the surface of this water he supposes the terrestrial strata to be expanded. This, according to him, is what Moses calls the *great deep*, and what most authors render the *great abyss*. The water of this vast abyss, he alleges, communicates with that of the ocean, by means of certain hiatuses or chafms passing betwixt it and the bottom of the ocean; and this and the abyss he supposes to have one common centre, around which the water of both is placed; but so, that the ordinary surface of the abyss is not level with that of the ocean, nor at so great a distance from the centre as the other, it being for the most part restrained and depressed by the strata of earth lying upon it: but wherever these strata are broken, or so lax and porous that water can pervade them, there the water of the abyss ascends; fills up all the clefts and fissures into which it can get admittance; and saturates all the interstices and pores of the earth, stone, or other matter, all around the globe, quite up to the level of the ocean.

The existence of an abyss or receptacle of subterraneous waters, is controverted by Camerarius*; and defended by Dr Woodward chiefly by two arguments: the first drawn from the vast quantity of water which covered the earth, in the time of the deluge; the second, from the consideration of earthquakes, which he endeavours to show are occasioned by the violence of the waters in this abyss. A great part of the terrestrial globe has been frequently shaken at the same moment; which argues, according to him, that the waters, which were the occasion thereof, were coextended with that part of the globe. There are even instances of universal earthquakes; which (says he) show, that the whole abyss must have been agitated; for so general an effect must have been produced by as general a cause, and that cause can be nothing but the subterraneous abyss †.

To this abyss also has been attributed the origin of springs and rivers; the level maintained in the surfaces of different seas; and their not overflowing their banks. To the effluvia emitted from it, some even attribute all the diversities of weather and change in our atmosphere ‡. Ray ||, and other authors, ancient as well as modern, suppose a communication between the Caspian sea and the ocean by means of a subterranean abyss: and to this they attribute it that the Caspian does not overflow, notwithstanding the great number of large rivers it receives, of which Kempfer rec-

Abyfs.

* *Dissert. Taur. Africa. Erud. supp.* tom. vi. p. 24.

† *Hist. of the Earth. Journal de Savans.* tom. lviii. p. 393.

‡ *Memirs of Literature.* tom. viii. p. 101. &c. § *Holloway.* Woodward's *Hist. of the Earth.* *Acta Erud.* 1727. p. 313. || *Physico-Theol.*

Rec. Dife. ii. c. 2. kons P. 76.

Abyfs,
Abyffinia.

Abyffinia.

kons above 50 in the compafs of 60 miles; though others fuppofe that the daily evaporation may fuffice to keep the level.

The different arguments concerning this fubject may be feen collected and amplified in "Cockburn's Inquiry into the Truth and Certainty of the Mofaic Deluge," p. 271, &c. After all, however, this amazing theory of a central abyfs is far from being demonftrated: it will perhaps in feveral refpects appear inconfiftent with found philofophy, as well as repugnant to the phenomena of nature. In particular, if we believe any thing like elective attraction to have prevailed in the formation of the earth, we muft believe that the feparation of the chaos proceeded from the union of fimilar particles. It is certain that reft is favourable to fuch operations of nature. As, therefore, the central parts of the earth were more immediately quiefcent than thofe remote from the centre, it feems abfurd to fuppofe that the heavier and denser bodies gave place to the more light and fluid; that the central part fhould confift of water only, and the more fuperficial part of a cruft or fhell. Vid. "Whitehurft's Inquiry into the original Formation of the Strata," &c. See DELUGE.

ABYSS is alfo ufed to denote hell; in which fenfe the word is fynonymous with what is otherwife called *Barathrum*, *Erebus*, and *Tartarus*; in the Englifh Bible, the *bottomlefs pit*. The unclean fpirits expelled by Chrift, begged, *ne imperaret ut in abyffum irent*, according to the vulgate; *us abyffon*, according to the Greek, Luke viii. 31. Rev. ix. 1.

ABYSS is more particularly ufed, in *Antiquity*, to denote the temple of Proferpine. It was thus called on account of the immense fund of gold and riches deposited there; fome fay hid under ground.

ABYSS is alfo ufed in *Heraldry* to denote the centre of an efcutcheon. In which fenfe a thing is faid to be borne in abyfs, *en abyffine*, when placed in the middle of the fhield, clear from any other bearing: He bears azure, a flower de lis, in abyfs.

ABYSSINIA, ABASSIA, OR UPPER ETHIOPIA, in *Geography*, an empire of Africa within the torrid zone, which is comprehended between the 7th and 16th degree N. Lat. and the 30th and 40th degree of E. Long. By fome writers of antiquity the title of *Ethiopi*ans was given to all nations whofe complexion was black: hence we find the Arabians, as well as many other Afatics, fometimes falling under this denomination; befides a number of Africans whofe country lay at a diftance from Ethiopia properly fo called. Thus the Africans in general were divided into the western or Hefperian Ethiopians, and thofe above Egypt fituated to the eaft; the latter being much more generally known than the former, by reafon of the commerce they carried on with the Egyptians.

From this account we may eafily underftand why there fhould be fuch a feeming difagreement among ancient authors concerning the fituation of the empire of Ethiopia, and likewise why it fhould pafs under fuch a variety of names. Sometimes, for example, it was named *India*, and the inhabitants *Indians*; an appellation likewise applied to many other diftant nations. It was alfo denominatd *Atlantia* and *Etheria*, and in the moft remote periods of antiquity *Cephenia*; but more ufually *Abafene*, a word fomewhat refembling

Abaffia or *Abyffinia*, its modern names. On the other hand, we find Perfia, Chaldaea, Affyria, &c. ftyled *Ethiopia* by fome writers; and all the countries extending along the coafts of the Red fea were promifcuoufly denominatd *India* and *Ethiopia*. By the Jews the empire of Ethiopia was ftyled *Cufh* and *Ludim*.

Notwithftanding this diverfity of appellations, and vaft diffufion of territory afcribed to the Ethiopians, there was one country to which the title was thought more properly to belong than to any of the reft; and which was therefore called *Ethiopia Propria*. This was bounded on the north by Egypt, extending all the way to the leffer cataract of the Nile, and an ifland named *Elephantine*; on the weft it had Libya Interior; on the eaft the Red fea, and on the fouth unknown parts of Africa; though thefe boundaries cannot be fixed with any kind of precifion.

In this country the ancients diftinguifhed a great variety of different nations, to whom they gave names either from fome perfonal circumftance, or from their manner of living. The principal of thefe were, 1. The *Blemmyes*, feated near the borders of Egypt; and who, probably from the fhortnefs of their necks, were faid to have no heads, but eyes, mouths, &c. in their breafte. Their form muft have been very extraordinary, if we believe Vopifcus, who gives an account of fome of the captives of this nation brought to Rome. 2. The *Nubate*, inhabiting the banks of the Nile near the ifland Elephantine already mentioned, faid to have been removed thither by Oafis to repress the incurfions of the Blemmyes. 3. The *Troglodytes*, by fome writers faid to belong to Egypt, and defcribed as little fuperior to brutes. 4. The *Nubians*, of whom little more is known than their name. 5. The *Pigmies*, by fome fuppofed to be a tribe of Troglodytes; but by others placed on the African coaft of the Red fea. 6. The *Aualite* or *Abalite*, of which we know nothing more than that they were fituated near the Abalitic gulf. 7. The *Struthiophagi*, fo called from their feeding upon oſtriches, were fituated to the fouth of the Memnones. 8. The *Aeridophagi*; 9. *Chelonophagi*; 10. *Ichthyophagi*; 11. *Cynamolgi*; 12. *Elephantophagi*; 13. *Rhizophagi*; 14. *Spermatophagi*; 15. *Hyllophagi*; and, 16. *Ophio-phagi*: all of whom had their names from the food they made ufe of, viz. locufts, tortoifes, fiſh, bitches milk, elephants, roots, fruits or feeds, and ferpents. 17. The *Hyllogones*, neighbours to the Elephantophagi, and who were fo favage that they had no houfes, nor any other places to fleep in but the tops of trees. 18. The *Pamphugi*, who ufed almoft every thing indifferently for food. 19. The *Agriophagi*, who lived on the fleſh of wild beaſte. 20. The *Anthropophagi*, or man-eaters, are now fuppofed to have been the Caffes, and not any inhabitants of Proper Ethiopia. 21. The *Hippophagi*, or horfe-eaters, who lay to the northward of Libya Incognita. 22. The *Macrobii*, a powerful nation, remarkable for their longevity; fome of them attaining the age of 120 years. 23. The *Sambri*, fituated near the city of Tenupfis in Nubia upon the Nile; of whom it is reported that all the quadrupeds they had, not excepting even the elephants, were deftitute of ears. 24. The *Aſachae*, a people inhabiting the mountainous parts, and continually employed in hunting elephants. Befides thefe, there were a num-

Different
nations ac-
cording to
the an-
cients.Situation of
Ethiopia
Propria.Different
names.

Abyfinia. ber of other nations or tribes, of whom we scarce know any thing but the names; as the Gapachi, Ptoemphanes, Catadupi, Pechini, Catadre, &c.

First settle-ment. In a country inhabited by such a variety of nations, all in a state of extreme barbarism, it is rather to be wondered that we have any history at all, than that it is not more distinct. It has already been observed, that the Jews, from the authority of the sacred writers no doubt, bestowed the name of *Cush* upon the empire of Ethiopia; and it is generally agreed that *Cush* was the great progenitor of the inhabitants. In some passages of Scripture, however, it would seem that *Cush* was an appellation bestowed upon the whole peninsula of Arabia, or at least the greater part of it. In others, the word seems to denominate the country watered by the Araxes, the seat of the ancient Scythians or *Cushites*; and sometimes the country adjacent to Egypt on the coast of the Red sea.

A number of authors are of opinion, that Ethiopia received its first inhabitants from the country lying to the east of the Red sea. According to them, the descendants of *Cush*, having settled in Arabia, gradually migrated to the south-eastern extremity of that country; whence, by an easy passage across the straits of Babelmandel, they transported themselves to the African side, and entered the country properly called *Ethiopia*: a migration which, according to Eusebius, took place during the residence of the Israelites in Egypt; but, in the opinion of Syncellus, after they had taken possession of Canaan, and were governed by judges.

Abyfinian tradition concerning it. Mr Bruce makes mention of a tradition among the Abyfinians, which, they say, has existed among them from time immemorial, that very soon after the flood, *Cush* the grandson of Noah, with his family, passed through Atbara, then without inhabitants, till they came to the ridge of mountains which separates that country from the high lands of Abyfinia. Here, still terrified with the thoughts of the deluge, and apprehensive of a return of the same calamity, they chose to dwell in caves made in the sides of these mountains, rather than trust themselves in the plains of Atbara; and our author is of opinion, that the tropical rains, which they could not fail to meet with in their journey southward, and which would appear like the return of the deluge, might induce them to take up their habitations in these high places. Be this as it will, he informs us that it is an undoubted fact, "that here the *Cushites*, with unparalleled industry, and with instruments utterly unknown to us, formed to themselves commodious, yet wonderful habitations in the heart of mountains of granite and marble, which remain entire in great numbers to this day, and promise to do so till the consummation of all things."

The *Cushites* having once established themselves among these mountains, continued to form habitations of the like kind in all the neighbouring ones; and thus following the different chains (for they never chose to descend into the low country), spread the arts and sciences, which they cultivated, quite across the African continent from the eastern to the western ocean. According to the tradition above-mentioned, they built the city of Axum early in the days of Abraham. This, though now an inconsiderable village, was anciently noted for its superb structures, of which some remains are still visible. Among these are some be-

Description of the city of Axum.

longing to a magnificent temple, originally 110 feet in length, and having two wings on each side; a double porch; and an ascent of 12 steps. Behind this stand several obelisks of different sizes, with the remains of several others which have been destroyed by the Turks. There is also a great square stone with an inscription, but so much effaced that nothing can be discovered excepting some Greek and Latin letters, and the word *Basilus*. Mr Bruce mentions some "prodigious fragments of colossal statues of the dog-star" still to be seen at this place; and "*Sivir* (adds he), which, in the language of the Troglodytes, and in that of the low country of Meroe, exactly corresponding to it, signifies a *dog*, instructs us in the reason why this province was called *Sivir*, and the large river which bounds it *Sivir*."

Soon after building the city of Axum, the *Cushites* founded that of Meroe, the capital of a large island or peninsula formed by the Nile, much mentioned by ancient historians, and where, according to Herodotus, they pursued the study of astronomy in very early ages with great success. Mr Bruce gives two reasons for their building this city in the low country after having built Axum in the mountainous part of Abyfinia.

1. They had discovered some inconveniences in their caves both in *Sivir* and the country below it, arising from the tropical rains in which they were now involved, and which prevented them from making the celestial observations to which they were so much addicted. 2. It is probable that they built this city farther from the mountains than they could have wished, in order to avoid the fly with which the southern parts were infested.

This animal, according to Mr Bruce, who has given a figure of it, is the most troublesome to quadrupeds that can be imagined. He informs us, that it infests those places within the tropical rains where the soil is black and loamy, and no other place whatever. It is named *Zimb* (by whom we are not informed), and has not been described by any other naturalist. It is of a size somewhat larger than a bee, thicker in proportion, and having broader wings, placed separate like those of a fly, and quite colourless, or without any spots. The head is large, with a sharp upper jaw; at the end of which is a strong pointed hair about a quarter of an inch long; and the lower jaw has two of these hairs: all of which together make a resistance to the finger equal to that of a strong hog's bristle. One or all of these hairs are used as weapons of offence to the cattle; but what purpose they answer to the animal itself, our author does not say. So intolerable, however, are its attacks to the cattle, that they no sooner hear its buzzing, than they forsake their food, and run about till they fall down with fright, fatigue, and hunger. Even the camel, though defended by a thick and strong skin with long hair, cannot resist the punctures of this insect; which seem to be poisonous, as they produce large putrid swellings on the body, head, and legs, which at last terminate in death. To avoid this dreadful enemy, the cattle must all be removed as quick as possible to the sandy parts of Atbara, where they stay as long as the rains last, and where this dreadful enemy never ventures to follow them. The elephant and rhinoceros, who, on account of the quantity of food they require, cannot remove to these barren places, roll themselves in the mud, which, when dry, coats them over so hard, that

Abyfinia.

Description of a pestilential fly.

Abyssinia. that they are enabled to resist the punctures of the insect; though even on these some tubercles are generally to be met with, which our author attributes to this cause. Mr Bruce is of opinion, that this is the fly mentioned by Isaiah, chap. vii. 18. 19. "And it shall come to pass, in that day, that the Lord shall *bis* for the fly that is in the uttermost part of the rivers of Egypt; and they shall come and shall rest all of them in the desolate valleys, and in the holes of the rocks, and upon all thorns, and upon all bushes." "That is (says Mr Bruce), they shall cut off from the cattle their usual retreat to the desert, by taking possession of these places, and meeting them there, where ordinarily they never come, and which therefore are the refuge of the cattle."

Meroe, which lay in N. Lat. 16°, the exact limit of the tropical rains, was without the bounds assigned by nature to these destructive insects; and consequently a place of refuge for the cattle. Mr Bruce, on his return through the desert, saw at Gerri, in this latitude, ruins, supposed to be those of Meroe, and caves in the mountains immediately above them; for he is of opinion, that they did not abandon their caverns immediately after they began to build cities. As a proof of this, he mentions that Thebes, in Upper Egypt, was built by a colony of Ethiopians; and that near the ruins of that city, a vast number of caves are to be seen even up to the top of a mountain in the neighbourhood: all of which are inhabited at this day. By degrees, however, they began to exchange these subterraneous habitations for the cities they built above ground; and thus became farmers, artificers, &c. though originally their sole employment had been commerce.

Magnificence of the ancient Indians and Egyptians.

On this subject Mr Bruce has given a very curious dissertation; though how far the application of it to the Ethiopians may be just, we cannot pretend to determine. He begins with observing, that the magnificence of the Indians and Egyptians has been celebrated from the most remote antiquity, without any account of the sources from whence all this wealth was derived: and indeed it must be owned, that in all histories of these people, there is a strange deficiency in this respect. The kings, we are to suppose, derived their splendour and magnificence from their subjects; but we are quite at a loss to know whence their subjects had it: and this seems the more strange, that in no period of their history are they ever represented in a poor or mean situation. Nor is this difficulty confined to these nations alone. Palestine, a country producing neither silver nor gold, is represented by the sacred writers as abounding in the early ages with both those metals in a much greater proportion than the most powerful European states can boast of, notwithstanding the vast supplies derived from the lately discovered continent of America. The Assyrian empire, in the time of Semiramis, was so noted for its wealth, that M. Montesquieu supposes it to have been obtained by the conquest of some more ancient and richer nation; the spoils of which enriched the Assyrians, as those of the latter afterwards did the Medes. This, however, Mr Bruce very justly observes, will not remove the difficulty, because we are equally at a loss to know whence the wealth was derived to that former nation; and it is very unusual to find an empire or kingdom of any extent enriched by conquest. The kingdom of Mace-

don, for instance, though Alexander the Great over-ran and plundered in a very short time the richest empire in the world, could never vie with the wealth of Tyre and Sidon. These last were commercial cities; and our author justly considers commerce as the only source from whence the wealth of a large kingdom ever was or could be derived. The riches of Semiramis, therefore, were accumulated by the East India trade centering for some time in her capital. While this was suffered to remain undisturbed, the empire flourished: but by an absurd expedition against India itself, in order to become mistress at once of all the wealth it contained, she lost that which she really possessed; and her empire was soon after entirely ruined. To the same source he attributes the riches of the ancient Egyptians; and is of opinion, that Sesostris opened up to Egypt the commerce with India by sea; though other authors speak of that monarch in very different terms. As the luxuries of India have somehow or other become the objects of desire to every nation in the world, this easily accounts for the wealth for which Egypt has in all ages been so much celebrated, as well as for that with which other countries abounded; while they served as a medium for transmitting those luxuries to other nations, and especially for the riches of those which naturally produced the Indian commodities so much sought after. This was the case particularly with Arabia, some of the productions of which were very much coveted by the western nations; and being, besides, the medium of communication between the East Indies and western nations, it is easy to see why the Arabian merchants soon became possessed of immense wealth.

Besides the territories already mentioned, the Cushites had extended themselves along the mountains which run parallel to the Red sea on the African side; which country, according to Mr Bruce, has "in all times been called *Sabo*, or *Azabo*, both which signify *South*;" an epithet given from its lying to the southward of the Arabian gulf, and which in ancient times was one of the richest and most important countries in the world. "By that acquisition (says our author), they enjoyed all the perfumes and aromatics in the east; myrrh, and frankincense, and cassia; all which grow spontaneously in that stripe of ground from the bay of Bilur west of Azab to Cape Gardafui, and then southward up in the Indian ocean, to near the coast of Melinda, where there is cinnamon, but of an inferior kind." As the Cushites or Troglodytes advanced still farther south, they met not only with mountains, in which they might excavate proper habitations, but likewise with great quantities of gold and silver furnished by the mines of Sofala, which, our author says, furnished "large quantities of both metals in their pure and unmixed state, lying in globules without any alloy or any necessity of preparation or separation." In other parts of his work, he labours to prove Sofala to have been the *Ophir* mentioned in Scripture.

Thus the Ethiopians, for some time after their settlement, according to Mr Bruce, must have been a first a civilized and learned people. The northern colonies from Meroe to Thebes built cities, and made improvements in architecture; cultivated commerce, agriculture, and the arts; not forgetting the

Abyssinia. the science of astronomy, for which they had an excellent opportunity by reason of the clearness of the sky in the Thebaid. Their brethren farther to the south, or those who inhabited Ethiopia properly so called, were confined for six months to their caves by reason of the tropical rains, whence they were naturally led to pursuits of another kind. "Letters*, at least one kind of them, and arithmetical characters (we are told), were invented by this middle part of the Cushites; while trade and astronomy, the natural history of the winds and seasons, were what necessarily employed that part of the colony established at Sofala most to the southward."

* Bruce's Travels.

Account of the Ethiopian Shepherds.

While the Cushites were thus employed at home in collecting gold, gathering and preparing spices, &c. these commodities were sent abroad into other countries by another set of people named *Shepherds*, who acted as carriers to them, and who afterwards proved so formidable to the Egyptians. These differed in their appearance from the Ethiopians, having long hair, and the features of Europeans; and were of a very dark complexion, though not at all like the blackmoors or negroes. They lived in the plain country in huts or moveable habitations, attending their cattle, and wandering up and down as various circumstances required. By acting as carriers to the Cushites, they became a great and powerful people, possessing vast numbers of cattle, as well as a very considerable extent of territory. They possessed a stripe of land along the Indian ocean; and to the northward of that another along the Red sea: but their principal habitation was the flat part of Africa between the northern tropic and the mountains of Abyssinia, which country is now called *Beja*. This reaches from Masuah along the sea-coast to Suakem; then turns westward, and continues in that direction, having the Nile on the south, the tropic of Cancer on the north, with the deserts of Selima and Libya on the west. The next district belonging to these people was Meroe, now called *Athara*, lying between the rivers Nile and Aftaboras. A third district, now called *Derkin*, is a small plain lying between the river Mareb on the east and Athara on the west. But the most noble and warlike of all the Shepherds were those who possessed the mountains of Habab, reaching from the neighbourhood of Masuah to Suakem; which district is still inhabited by them.

Different classes of them.

These Shepherds, according to our author, were distinguished by several different appellations, which may be supposed to denote different degrees of rank among them. Those called simply *Shepherds*, our author supposes to have been the common sort who attended the flocks. Another set were called *Hycfos* or *Ayfos*, signifying "armed shepherds," who are supposed to have been the soldiers. A third were named *Agag*, supposed to be the chiefs or nobles of these armed shepherds; whence the title of *king of kings*, according to Mr Bruce, is derived; and he supposes *Agag* killed by Samuel to have been an Arabian shepherd.

The building of Carthage augmented the power of the Shepherds to a considerable degree, by reason of the vast quantity of carriage naturally belonging to a place of such extensive commerce, and which fell into the hands of the Lehabim, Lubim, or Libyan peasants. An immense multitude of camels, in the early

ages, answered the purpose of navigation: and thus we find that commerce was carried on by the Ishmaelites as early as the days of Joseph, from the southern extremity of the Arabian peninsula. These Shepherds, however, though generally the friends and allies of the Egyptians, who were also Cushites, sometimes proved very bitter enemies to them, as is related in the history of that country. The reason of this may be deduced from the great opposition betwixt their manners and customs. The Egyptians worshipped black cattle, which the Shepherds killed and used as food; the latter worshipped the heavenly bodies, while the Egyptians were the grossest idolaters, and worshipped idols of all kinds that can be imagined. Hence a mere difference in religion might occasion many bloody quarrels; though, if the above account can be depended upon as authentic, it is natural to imagine that the mutual connection of interest should have cemented their friendship, whatever difference there might happen to be in opinions of any kind.

Reason of the enmity between the Shepherds and Egyptians.

Besides the Cushites and Shepherds, however, we must now seek for the origin of those different nations which have already been mentioned. Mr Bruce allows that there are various nations inhabiting this country, who are fairer than either the Cushites or the Shepherds, and which, though they have each a particular name, are all known by the general title of *Habesh*; which may be translated by the Latin word *convence*, signifying a number of distinct people meeting accidentally in one place; and which our author maintains against Scaliger, Ludolf, and a number of others, to be a very just translation, and quite consonant to the history of the country.

Origin of the different Ethiopian nations.

The most authentic ancient history of this country, according to Mr Bruce, is the chronicle of Axum; the character of which, among the modern Abyssinians, stands next to the sacred writings themselves; and consequently must be esteemed the highest Abyssinian authority we have on the subject. According to this book, there was an interval of 5500 years between the creation of the world and the birth of Christ; 1808 years before which last event the empire of Abyssinia or Ethiopia received its first inhabitants. Two hundred years after its settlement, it was so destroyed by a flood that it received the name of *Curè Midra*, or a country laid waste; "or (says our author) as it is called in Scripture, *a land which the waters or floods had spoiled*," (Isaiah xviii. 2.) The peopling of the country was finished about 1400 years before Christ, by the settlement of a great number of people, speaking different languages, who sat down peaceably in the high lands of Tigré, in the neighbourhood of the Shepherds, with whom they were in friendship. These people, according to tradition, came from Palestine; and our author is inclined to believe the whole of the relation to be true, as the time coincides with the expulsion of the Canaanitish nations by Joshua, which happened about 1490 B. C. ten years before which there had been, according to Pausanias, a flood in Ethiopia which occasioned prodigious devastation. Ethiopia, he thinks, would afford the most ready asylum for the fugitive Canaanites, as they must have long had a commercial intercourse with that country; and he supports the opinion likewise from what Procopius mentions of two pillars extant in his time, on the coast

First settlement of Ethiopia, according to the Abyssinian history.

The country laid waste by a deluge.

Abyssinia. coast of Mauritania, with the following inscription in the Phœnician language: "We are Canaanites, flying from the face of Joshua the son of Nun, the robber." The authenticity of these inscriptions, however, is much disputed, and therefore it cannot go a great way in establishing any historical point. The first and most considerable of the colonies above mentioned settled in the province of Amhara; the second in Darnot, one of the southern provinces; the third in another province called *Iassa*, or *Teberatz-Agow*, from *Tebera* their principal habitation; and a fourth in the territory of Galat.

Ethiopia
conquered
by Moses.

Our author goes on to prove, that the Ethiopians in ancient times were not only the most learned people in the world, but that they spoke the original language, and were the inventors of writing. In what manner they came to degenerate from this character, and into their present state of barbarity, cannot be known; this being a phenomenon equally unaccountable with the degeneracy of the Egyptians. According to some authors, the Ethiopians were conquered by Moses; of which transaction we have the following account. Before the time of that legislator, the Ethiopians possessed the country of Thebais in Egypt: but, not content with this, they made an irruption into Lower Egypt, and penetrated as far as Memphis; where, having defeated the Egyptians, they threatened the kingdom with total destruction. The Egyptians, by the advice of their oracles, put Moses at the head of their forces; who immediately prepared for invading the enemy's country. The Ethiopians imagined that he would march along the banks of the Nile; but Moses chose rather to pass through some of the interior countries, though greatly infested with serpents, and where consequently his march must be attended with much danger. To preserve his men, he constructed a number of chests or panniers of the Egyptian reed papyrus, which he filled with the birds named *Ibis*, celebrated for their antipathy to serpents. As soon as he approached the tract abounding with these reptiles, a sufficient number of the birds were let out, who presently cleared the way for the army by destroying the serpents. Thus the Ethiopians were surprised in their own country, where they had dreaded no invasion; their forces, being defeated in the field, were at last shut up in the capital Meroe, a city almost impregnable, by being surrounded with three rivers, the Nile, Atapus, and Astaboras. The daughter of the Ethiopian monarch, however, having an opportunity of seeing Moses from the walls, fell in love with him, and offered to deliver up the city, provided he would swear to marry her. With this requisition the Jewish legislator complied; but treated the inhabitants with great severity, plundering the city, and putting many of the inhabitants to death. After this he ravaged the whole country, dismantling all the places of strength; and having thus rendered the Ethiopians incapable of attempting any thing against other nations for a considerable time, he returned in triumph to Egypt, after an absence of ten years.

From the time of Moses to that of Solomon, there is a chasm in the Ethiopic history. After this, however, we are furnished with some kind of regular accounts. The history commences with the queen of

Sheba, who came to visit the Jewish monarch, and whom the Abyssinians suppose to have been sovereign of Ethiopia Propria; but Mr Bruce is of opinion that she was only sovereign of that territory on the eastern coast of Africa named *Saba*, which he says ought to be her title instead of *Sheba*. In favour of this opinion, he likewise urges, that it was customary for the Sabæans, or inhabitants of the African district named *Saba*, to be governed by women; whereas those who inhabited the opposite side of the Arabian gulf, and who were named *Sabæan Arabs* or *Homerites*, were not only governed by kings, but would not allow their sovereigns to go abroad anywhere under pain of being stoned to death. The Abyssinians, as has been already hinted, claimed her for their sovereign; and he informs us, that having received an account from Tamerin, an Ethiopian merchant, of the surprising wisdom and wealth of Solomon, she undertook the journey mentioned in Scripture, to ascertain the truth of the report. In this she was attended by a great many of her nobility, carrying along with her also magnificent presents for the monarch she intended to visit. According to the Abyssinian historians, she was a Pagan at the time this journey was undertaken; but being struck with admiration at the sight of Solomon's grandeur, and the wisdom he displayed, she became a convert to the true religion. Another part of her history, by no means inconsistent with the character of Solomon, is, that she returned in a state of pregnancy; and within a year was delivered of a son, named *David* by Solomon; but by his mother *Menilek*, *Menelech*, or *Menelebeck*; that is, *another self*. When he grew up, he was sent to be educated at the court of his father Solomon; where having staid some time, he was accompanied home by many doctors of the law, and other Israelites of distinction, particularly Azariah the son of Zadoc the high-priest. By these the Jewish religion was established in Abyssinia, where it continued till the introduction of Christianity. The princess we speak of is named *Makeda*, *Balkis*, or *Bulkis*, by the Abyssinians. By our Saviour, and in the Ethiopic version of the Scripture, she is styled *The Queen of the South*, and is said to have come from the uttermost parts of the earth, or of the habitable world. Hence the compilers of the Universal History have inferred, that the princess styled *The Queen of Sheba* in Scripture was really sovereign of Ethiopia. "Ethiopia (say they) is more to the south of Judæa than the territory or kingdom of Saba in Arabia Felix; consequently has a better claim than that country for the dominions of the princess whom our Saviour calls *The Queen of the South*. Ethiopia is styled *the remotest part of the habitable world* by Herodotus and Strabo; and therefore better agrees with what our Saviour has said of the queen of Sheba, that she came from 'the uttermost parts of the earth,' than Arabia. Nor can it be deemed a sufficient reply to this argument, that Arabia Felix was the uttermost part of the earth in respect to Judæa, since it was bounded by the Red sea: for that not only Egypt, but even Ethiopia, regions beyond that sea, were known to, and had a communication with the Jews, both before and in our Saviour's time, is indisputably clear. Lastly, From what has been suggested, it appears no improbable conjecture, that Judaism was not only known, at least in a part of Ethiopia,

Abyssinia.
Of the
queen of
Sheba.

Abyssinia. Ethiopia, but nearly related to the established religion there, at the beginning of the apostolic age, if not much earlier. After all, these two opinions, so contrary in appearance, may be made consistent without great difficulty; since it is agreed, that Arabia and Ethiopia have anciently borne the same name, been included during certain intervals in one empire, and governed by one prince. Part of the Arabs and Ethiopians had the same origin, and very considerable numbers of the Abaseni transported themselves from Arabia Felix into Ethiopia; a circumstance which sufficiently proves the intercourse that formerly subsisted between the Cushites or Ethiopians of Asia and Africa.

The Abyssinian historians farther inform us, that the young prince Menilek was anointed and crowned king in the temple of Jerusalem, before he returned to his own country; that Azariah was constituted high-priest; that he brought with him a Hebrew transcript of the law; and though this book is now lost, having been burnt along with the church of Axum, the office is still continued in the line of Azariah, whose successors are styled *Nebrits*, *high-priests*, or *keepers of the church*, in that city; both church and state being modelled exactly after that of Jerusalem. Makeda continued to enjoy the sovereignty for 40 years; and the last act of her reign was to settle the succession to the throne. By this act the crown was declared hereditary in the family of Solomon for ever; it was also determined, that after her no woman should be entitled to wear the crown or act as sovereign of the country; but that the sovereignty should descend to the most distant heirs male, rather than to the females, however near; which two articles were to be considered as fundamental laws of the empire, not to be abolished. Lastly, That the male heirs of the royal family should always be sent prisoners to a high mountain, where they were to be confined till they should be called to the throne, or as long as they lived. This custom, according to Mr Bruce, was peculiar to Abyssinia; the neighbouring Shepherds being accustomed to have women for their sovereigns, which prevailed in the last century, and perhaps does so at present.

Ethiopia
conquered
by Shishak.

Makeda having established these laws in such a manner as not to be revocable, died in the year 986 B. C. The transactions of her son Menilek after his accession are not pointed out, farther than that he removed his capital to Tigré. His reign can by no means be accounted prosperous; since in his time the empire was invaded by Shishak or Sefak the king of Egypt, who plundered the temple of Jerusalem under Rehoboam. The like fate attended a rich temple which had been built at Saba the capital of the Ethiopian empire, and which might very probably occasion the removal of the imperial seat to Tigré, as already mentioned. It is indeed pretty plain from Scripture, that Ethiopia, or great part of it, was subject to this monarch; as the Ethiopians or Cushites, mentioned in his army which invaded Judea, are joined with the Lubims or Libyans, and must therefore be accounted inhabitants of Ethiopia Proper. This is indeed no small confirmation of the opinion of Sir Isaac Newton, who agrees with Josephus in supposing Shishak to have been the celebrated Sesostris of profane historians. Thus far we are certain, that in the passage of Scripture just

now alluded to, the sacred historian indirectly ascribes the sovereignty of Ethiopia to Shishak; and we do not find it anywhere hinted that another Egyptian monarch was possessed of this sovereignty. Herodotus also plainly tells us, that Sesostris was master of Ethiopia, and that no other Egyptian but himself ever possessed that empire.

During the reign of Shishak, we know no particulars concerning the Ethiopians; but after his death, Sir Isaac Newton is of opinion, that they defended Egypt against the Libyans, who had taken an opportunity of invading the country during the civil war which took place on the death of that great conqueror. In about ten years afterwards, however, according to the same author, they became aggressors; drowned the successor of Shishak in the Nile, and seized on the whole kingdom; at which time Libya also fell into their hands. In the time of Afa king of Judah, we find the combined host of the Ethiopians and Lubims or Libyans, making an attack on the territories of that prince, to the number of more than a million. This may be reckoned a considerable confirmation of the piece of history just mentioned; as it is not easy to conceive how the two should combine in such a manner, unless Zerah was master of both. The total overthrow which the allied army received from Afa, gave the inhabitants of Lower Egypt an opportunity of revolting; who being sustained by an army of 20,000 auxiliaries from Phœnicia and Palestine, obliged Memnon, supposed to be the same with Amenophis, to retire to Memphis. Soon after this he was forced to leave Egypt altogether, and to retire into Ethiopia; but in about 13 years he returned with his son Ramesses at the head of a powerful army, and obliged the Canaanitish forces to retire out of Lower Egypt; a transaction denominated by the Egyptian writers the *second expulsion of the Shepherds*.

Sir Isaac Newton is of opinion, that the Egyptian princes Menes, Memnon, and Amenophis, were the same person; and that by him Memphis was either originally built or first fortified, in order to prevent the Egyptians from entering Ethiopia. He is also supposed to have been the son of Zerah, and to have died at a very advanced age about 90 years after the decease of Solomon. Thus, according to Sir Isaac Newton's chronology, the most remarkable transactions of antiquity will be brought lower by ages than by the usually received computations. According to this, the Argonautic expedition happened in the time of Amenophis; though some Greek writers inform us, that the same prince assisted Priam king of Troy with a body of forces. He was succeeded by Ramesses, already mentioned, who built the northern portico of the temple of Vulcan at Memphis. The next was Moeris; who adorned Memphis, and made it the capital of his empire, about two generations after the Trojan war. Cheops, Caphrenus, and Mycerinus, succeeded in order to Moeris; the last being succeeded by his sister Nitocris. In the reign of Afychis her successor, both Ethiopia and Assyria revolted from Egypt; which, being now divided into several small kingdoms, was quickly subdued by Sabacon or So, the emperor of Ethiopia. This monarch, soon after his accession to the throne of Egypt, allied himself with Hoshea king of Israel; by which means the latter was induced to

Abyssinia. revolt from the Assyrians; and in consequence of this, an end was put to the kingdom of Israel by Shalmaneser king of Assyria, in the 24th year of the era of Nabonassar, and 720th before the commencement of the Christian era. According to Herodotus, this monarch voluntarily resigned the crown of Egypt after he had enjoyed it 50 years; but Africanus relates, that after a reign of eight years, he died in Egypt, in the ninth year of Hezekiah king of Judah. His successor Sethon, supposed to be the Sevechus of Manetho, advanced to Pelusium with a powerful army against Sennacherib king of Assyria; when the bowstrings of the Assyrians were gnawed in pieces by a great number of rats or mice, and thus they were easily defeated with great slaughter by the Egyptians. Hence Herodotus informs us, that the statue of Sethon which he saw in Egypt had a mouse in its hand. Sir Isaac Newton, however, explains the whole in an allegorical manner. As the mouse among the Egyptians was a symbol of destruction, he conjectures, that the Assyrians were on this occasion overthrown with great slaughter; and that Sethon, in conjunction with Terhakah, either king of the Arabian Cushites, or a relation of Sethon, and his viceroy in Ethiopia Proper, surprised and defeated Sennacherib betwixt Libnah and Pelusium, making as great slaughter among his troops as if their shieldstraps and bowstrings had been destroyed by mice.

Ethiopia subdued by Efarhaddon. In the 78th year of the era of Nabonassar, the empire of Ethiopia was subdued by Efarhaddon king of Assyria; who held it three years, committing enormous cruelties both in that country and in Egypt. After his death the Ethiopians shook off the yoke, and maintained their independency till the time of Cyrus the Great, the first king of Persia; who, according to the Greek historian Xenophon, seems to have also been sovereign of Ethiopia. After his death they revolted, and his son Cambyfes unsuccessfully attempted to reduce them. Herodotus informs us, that before he undertook this expedition, he sent some of the Ichthyophagi ambassadors to the king of the Macrobi or long-lived Ethiopians, under pretence of soliciting his friendship, but in reality to observe the strength of the country. Of this the Ethiopian prince was aware, and told the ambassadors that he knew their design, reproached Cambyfes with his injustice and ambition, and gave them his bow; telling them at the same time, that the Persians might think of invading Ethiopia when they could easily bend it; and in the mean time, that their master ought to thank the gods who had never inspired the Ethiopians with a desire of extending their territories by conquest. Cambyfes had sent by the ambassadors a rich purple robe, gold bracelets, a box of precious ointment, a vessel full of palm wine, and other things, which he imagined would be acceptable to the Ethiopian monarch. But all these, excepting the wine, were despised. This, he owned, was superior to any liquor produced in Ethiopia; and he did not scruple to intimate, that the Persians, short-lived as they were, owed most of their days to the use of this excellent liquor. Being informed by the ambassadors that a considerable part of the food made use of by the Persians was bread, he said that it was no wonder to find people who lived on *dung* unable to attain the longevity of the Macrobian Ethiopians. In short, the

whole of his answer was so contemptuous and disgusting, that Cambyfes was filled with the greatest indignation; in consequence of which, he instantly began his march without taking time to make the necessary preparations, or even to procure provisions of any kind for his army. Thus a famine ensued among them; which at last became so grievous, that the soldiers were obliged to eat one another: and Cambyfes himself, finding his life in great danger, was obliged to give orders for marching back again; which was not accomplished without the loss of a great number of men. Another army which he sent on an expedition against Ammonia, in order to destroy the celebrated oracle of Jupiter Ammon, perished entirely in the deserts, being overwhelmed with the vast clouds of sand frequently raised there by the wind.

At this time, it is doubtful whether Cambyfes would have accomplished his purpose even if he had found it practicable to march into the heart of Ethiopia. This empire had but a short time before received a very considerable accession of strength by the desertion of 240,000 Egyptians who had been posted by Pflammenitus in different places on the frontiers. These not having been relieved for three years, had gone over at once to the emperor of Ethiopia, who placed them in a country disaffected to him; ordering them to expel the inhabitants, and take possession of their lands. Notwithstanding this, however, Sir Isaac Newton hints, that Cambyfes conquered Ethiopia about the 223d or 224th year of the era of Nabonassar; but his opinion in this respect does not appear to be well founded. We are told indeed, that the Persian monarch, notwithstanding the misfortunes he met with in the expedition above mentioned, did really make himself master of some of the Ethiopic provinces which bordered on Egypt; and that these, together with the Troglodytes, sent him an annual present of two choenixes of unrefined gold, 200 bundles of ebony, five Ethiopian boys, and 20 elephants teeth of the largest size: but it appears improbable to the last degree, that even though Cambyfes had employed the whole of his reign in the attempt, he could have conquered the vast regions of Ethiopia Proper, Sennaar, and Abassia, which were all included in the Ethiopia of the ancients.

When Xerxes invaded Greece, we find his army, according to Herodotus, was partly composed of Ethiopians, of whom Herodotus mentions two distinct races of people. One of these inhabited the Asiatic coast, and differed from the Indians only in their hair and language. Their arms were the same with those of India; they wore helmets made of the skins of horses, the ears and manes of which served them for tufts and plumes of feathers; their shields being made of the skins of cranes. The hair of the Asiatic Ethiopians was long, but that of the western tribes was frizzled. The latter were also differently armed, having darts lighted at one end and covered with leather. We are not informed particularly from what nations these troops were brought, nor whether they were natural subjects of the king of Persia, or only auxiliaries: of consequence we can conclude nothing certain concerning the dominion of the Persian monarchs at this time over Ethiopia, farther than that they might possess some of the provinces next to Egypt; while the main body

Abyssinia.

Ethiopia at this time a powerful empire.

Ethiopia supposed by Sir Isaac Newton to have been conquered by Cambyfes.

Ethiopian employed by Xerxes.

Abyssinia. body of the empire being in a state of independence, and unconnected with other parts of the world, is not taken notice of by the historians of those times.

Ethiopia
conquered
by Ptolemy
Euergetes.

Though Alexander the Great had a desire to know the sources of the Nile, he did not suffer himself to be diverted by this curiosity from pursuing his grand expedition into Persia. Ptolemy Euergetes, however, appears to have carried this curiosity to such an extremity as to invade Ethiopia for no other purpose. It is surprising that the particulars of this expedition are not recorded by any historian, as it appears by an inscription that he penetrated to the farthest parts of the empire, and conquered the most powerful nations in it. Of this we have the following account, which is looked upon by the best historians to be authentic. It was copied on the spot (being the western entrance to Adule, one of the cities of Ethiopia) by Cosmas Egyptian, or, as some call him, Cosmas Indicopleustes, in the time of the emperor Justin I. by order of Elebsaan king of the Axumites, and of which the following account is given by the person who copied it. "Here (says he), facing the road to Axuma, stood a chair of white marble, consisting of a square base, a small thin column at each angle of this base, with a larger wreathed one in the middle, a seat or throne upon these, a back and two sides. Behind this chair there was a large stone three cubits high, which had sustained considerable injury from time. This stone and chair contained an inscription to the following purpose: 'Ptolemy Euergetes penetrated to the farthest parts of Ethiopia. He subdued Gaza, Agame, Signe, Ava, Tiamo or Tziamo, Gambela, Zingabene, Angabe, Tiama, Athagaos, Calaa, Semene, Lafine, Zaa, Gabala, Atalino, Bega, the Tangaitæ, Anine, Metine, Sesea, Raufo, Solate, the territory of Raufo, and several other kingdoms. Among the nations he reduced, were some inhabiting mountains always covered with a deep snow; and others seated upon the ridges of hills, from whence issued boiling steams, and craggy precipices, which therefore seemed inaccessible. Having finally, after all these conquests, assembled his whole army at Adule, he sacrificed to Mars, Neptune, and Jupiter; for his great success, he dedicated this chair or throne to Mars.'

Conquest
of Ethiopia
by the Ro-
mans.

From the time of this conqueror to that of the emperor Augustus, we meet with nothing of any consequence relating to Ethiopia Proper. The Roman forces having about this time been drawn out of Egypt, in order to invade Arabia, Candace queen of Ethiopia, or perhaps rather of the island or peninsula of Meroe, took the opportunity of their absence to make an irruption, with a numerous army, into the province of Thebais. As there was at that time no force to oppose her, she met for some time with great success; but hearing at last that Petronius, governor of Egypt, was in full march to attack her, she retired into her own dominions. Petronius pursued her as far as Pselcha, where with 10,000 men he gained an easy victory over 30,000 undisciplined Ethiopian savages, armed only with poles, hatchets, and other clumsy or insignificant weapons of a similar nature. This victory was soon followed by the reduction of several fortresses; however, as the Roman soldiers were excessively incommoded by the heat of the climate, Petronius, notwithstanding his success, was obliged at

last to retire. Soon after, Candace sent ambassadors to Augustus himself with such magnificent presents, that the emperor is said to have been thereby induced to grant her a peace on her own terms. From this time the Romans accounted themselves masters of Ethiopia. Augustus was complimented on the great glory he had acquired; and that he had, by reducing a country till that time unknown even to the Romans, finished the conquest of Africa. No material alteration, however, took place in the affairs of Meroe, in consequence of this conquest, whether real or pretended. Pliny informs us that it had been governed by queens, who bore the title of Candace, for several generations before that time; and so it continued to be afterwards, as we learn from Scripture, where we are informed that, in the reign of Tiberius, the sovereign of Ethiopia was still named Candace. Some indeed are of opinion that the Candace mentioned in the Acts of the Apostles was the same with her who had been conquered by Augustus; but this seems by no means probable, as the interval of time is by far too long to be allowed for the reign of a single princess.

From an anecdote of the debauched emperor Helio-gabalus who was accustomed to confine his favourites, by way of diversion, with old Ethiopian women, we may learn that some intercourse took place between the two empires, and probably that the Ethiopians owned some kind of subjection to the Romans. The Blemmyes, a gang of monstrous banditti, who inhabited the frontiers of Thebais, were vanquished by the emperor Probus: but, towards the close of the third century, we find them again become so powerful, that in conjunction with another nation called *Nobate*, who inhabited the banks of the Nile near Upper Egypt, they committed such depredations in the Roman territories, that Dioclesian was obliged to assign lands to the latter, and to pay both of them a considerable sum annually, to desist from their former practices. These expedients did not answer the purpose; the savages continued their depredations till the time of the emperor Justinian, who treated them with more severity, and obliged them to remain at peace. We are told by Procopius, that before the time of Dioclesian, the Roman territories extended so far into Ethiopia, that their boundaries were not 23 days journey from the capital, so that probably the whole empire had been in a state of dependence on them.

From the time of this emperor to that of their conversion to Christianity, we find nothing remarkable in the history of the Ethiopians. Three hundred and twenty seven years are counted from the time of our Saviour to that of Abreha and Atzbeha, or from Abra and Asba, who enjoyed the kingdom when the Ethiopian gospel was preached in Ethiopia by Frumentius. This converted man was a kinsman and companion of a philosopher named Meropius, a native of Tyre; who having travelled all over India, died on an island of the Red sea. After his death Frumentius, with another named Ædesius, who had also been his companion, were brought before the king of Ethiopia, to whom that island was subject. He took them into his service; making the one his treasurer and the other his butler. On the death of this prince, the queen conceived such a favour for them, that she refused to allow them to depart out of the kingdom; but committed the management of her

Account of
the Blem-
myes.

The Ethiopians
converted
to Christi-
anity by
Frumentius.

Abyssinia. her affairs entirely to Frumentius, who made use of his influence to diffuse the Christian religion throughout the country, and at last was appointed bishop of Axuma. It is said, however, that the court and principal people, if not the nation in general, relapsed into idolatry, which continued to prevail till the year 521, when they were again converted by their king Adad or Aidog.

The two kings refuse to admit Arianism.

The two princes Abra and Asba, who reigned jointly in Ethiopia in the time of Frumentius, lived in such harmony together, that their friendship became almost proverbial. After being converted to Christianity, they adhered strictly to the orthodox doctrine, refusing to admit an Arian bishop into their country. In the time of the emperor Constantius, however, this heresy was introduced, and greatly favoured by that monarch; and an attempt was made to depose Frumentius on account of his refusal to embrace it.

Account of the war of the elephant.

The reign of these princes is remarkable for an expedition into Arabia Felix, called by the Mohammedan writers the war of the elephant, and which was undertaken on the following occasion: The temple of Mecca, situated nearly in the middle of the Arabian peninsula, had been held in the greatest veneration for near 1400 years; probably from the notion entertained by the people in the neighbourhood, that Adam pitched his tent on that spot. Here also was a black stone supposed to possess extraordinary sanctity, as being that on which Jacob laid his head when he had the vision of angels. The most probable account of the real origin of this temple, according to Mr Bruce, is, that it was built by Sesostris, and that he himself was worshipped there under the name of Osiris.

On account of the veneration in which this tower and idol were held by the Arabians, Mr Bruce supposes that the thought was first suggested of making it the emporium of the trade between India and Africa; but Abra, in order to divert it into another channel, built a very large temple near the Indian ocean in the country of the Homerites; and, to encourage the resort of people to this new temple, he bestowed upon it all the privileges of the former which stood in the city of Mecca. The tribe of Arabians named *Koreish*, in whose country Mecca stood, being exceedingly alarmed at the thoughts of having their temple deserted, entered the new one in the night, burned all that could be consumed, and besmeared the remains with human excrements. Abra, provoked at this sacrilege, assembled a considerable army, with which he invested Mecca, himself appearing on a white elephant, from whence the war took its name already mentioned.

Miraculous destruction of the Ethiopian army.

The termination of the war, according to the Arabian historians, was miraculous. A vast number of birds named *Ababil* came from the sea, having faces like lions; each carrying in its claws a small stone about the size of a pea, which they let fall upon the Ethiopian army in such numbers, that every one of them was destroyed. At this time it is said that the small-pox first made its appearance; and the more probable account of the destruction of the Ethiopian army is, that they perished by this distemper.

First appearance of the small-pox.

The war of the elephant is supposed to have terminated in the manner above mentioned about the year 360; from which time to that of Elefbaan, named also *Caleb*, and probably the same with the Adad or A-

dag already mentioned, we meet with nothing remarkable in the Ethiopic history. He engaged in a war with the Homerites or Sabæans in Arabia Felix, whom he overthrew in battle, and put an end to their kingdom; after which he embraced the Christian religion in token of gratitude for the success he had met with. In the time of this prince a violent persecution of the Christians took place in Arabia. The Jewish religion had now spread itself far into that peninsula; and in many places the professors of it were become absolute masters of the country, inasmuch that several Jewish principalities had been erected, the sovereigns of which commenced a severe persecution against the Christians. Among the rest, one Phineas distinguished himself by his cruelty, having prepared a great number of furnaces or pits filled with fire, into which he threw those who refused to renounce Christianity. The Christians applied for relief to the emperor Justin; but he being at that time engaged in a war with the Persians, could not interfere: however, in the year 522, he sent an embassy to Elefbaan, who was now also a member of the Greek church, intreating him to exert himself for the relief of the Christians of Arabia. On this the emperor commanded his general Abreha, governor of the Arabian province Yemen, to march to the assistance of Aretas, son to a prince of the same name whom Phineas had burnt; while he himself prepared to follow with a more considerable force. But before the arrival of the Ethiopian monarch, young Aretas had marched against Phineas, and entirely defeated him. In a short time afterwards the emperor himself arrived, and gave Phineas a second defeat; but notwithstanding these misfortunes, it does not appear that either the principality of Phineas or any of the other Jewish ones, was at this time overturned, though it seems to be certain, that at the time we speak of, the Ethiopians possessed part of the Arabian peninsula. According to the Arabian historians, the war of the elephant, with the miraculous destruction of the Ethiopian army, already mentioned, took place in the reign of Elefbaan.

Abyssinia. Reconversion to Christianity under Elefbaan. Christians persecuted in Arabia.

Cruelty of Phineas a Jewish prince.

He is defeated.

Some historians mention, that the Ethiopian monarchs embraced the doctrines of Mahomet soon after the impostor made his appearance; but this seems not to be well-founded; though it is certain that the *Najashi* or Ethiopian governor of Yemen embraced Mahomedanism, and that he was related to the royal family. On this occasion, however, the Ethiopians lost all the footing they once had in Arabia; the governors being expelled by Mohammed and his successors. They fled to the African side of the Red sea with numbers of their subjects, where they erected several small kingdoms, as Adel, Wypo, Hadea, Mara, and others, which still continue.

Ethiopians driven out of Arabia.

During the conquests of the caliphs, the Jews were for some time everywhere driven out of their dominions, or oppressed to such a degree that they voluntarily left them. Ethiopia offered them an asylum: and in this country they became so powerful, that a revolution in favour of Judaism seemed ready to take place. One family had always preserved an independent sovereignty on a mountain called Samen, the royal residence being on the top of a high rock; and several other high and rugged mountains were used by that people as natural fortresses. Becoming by de-

Number of Jews in Ethiopia increased.

Abyssinia. grows more and more powerful, Judith the daughter of one of their kings formed a design of overturning the Ethiopian government, and setting aside the family of Solomon, who had hitherto continued to enjoy the sovereignty. This design was facilitated by several circumstances. The empire had been weakened by an unsuccessful war, famine, and plague; the throne was possessed by an infant; and the absurd custom of confining the whole royal family on a rock named *Damo*, gave her an opportunity of cutting them all off at once by surprising that place. Fortunately, however, the king himself escaped the general catastrophe, and was conveyed by some of the nobility of Amhara to the province of Xoa or Shoa; by which means the line of Solomon was preserved, and afterwards restored, though not till after a very considerable interval.

Royal family of Ethiopia massacred by Judith.

The king escapes.

Judith usurps the throne.

A new revolution.

Christians persecuted in Egypt fly to Ethiopia.

Lalibala undertakes to diminish the stream of the Nile.

Judith having by this massacre established her own power, assumed the imperial dignity, though in direct opposition to an established and fundamental law of the empire already mentioned, that no woman should enjoy the sovereign authority. The people, however, seem to have submitted quietly to her government, as she sat on the throne for 40 years, and afterwards transmitted the sovereignty to her posterity; five of whom reigned successively in this country. We are not furnished with any particulars concerning their reigns; farther than that, during them, the people were greatly oppressed. By some means, of which historians have not given any account, another revolution took place; and a new set of usurpers, related to the family of Judith, but not their direct lineal descendants, succeeded to the throne. These were Christians, and governed with much greater lenity than the Jewish sovereigns had done; but still, being usurpers, none of their transactions are recorded in the Abyssinian annals, excepting those of Lalibala, who was accounted a saint. He lived in the end of the 12th or beginning of the 13th century, and proved a great prince. At that time the Christians in Egypt were grievously persecuted by the Saracens, who had a particular abhorrence at masons, builders, and stone-cutters; looking upon them as the chief promoters of idolatry by the ornaments they put upon their works. These were joyfully received by Lalibala; who by affording them an asylum in his dominions, soon collected a great number. They were employed by him in hewing churches out of the solid rock, after the example of the ancient Troglodytic habitations; and many works of this kind remain in the country to this day. He undertook, however, a still more difficult and arduous task; no less than that of lessening the stream of the Nile, and thus starving the whole kingdom of Egypt, now in the hands of his enemies, and who persecuted those of this religion. From the account given by Mr Bruce of this project, it appears that there really is a possibility in nature of accomplishing it; not indeed by turning the course of the Nile itself, but by diverting that of many of its branches, which are the means of conveying into it the water supplied by the tropical rains, and by which it overflows its banks annually. We are likewise assured by the same author, that Lalibala succeeded in his enterprise so far as to divert the course of two large rivers from the Nile, and that they have ever since flowed into the Indian ocean. He next proceeded to carry a level towards a lake named *Zacvia*,

into which many rivers, whose streams contribute to increase that of the Nile, empty themselves; and had this been accomplished, there is no doubt that the loss of so much water would have been very sensibly felt by the Egyptians. According to most historians, this enterprising monarch was prevented by death from putting his design in execution; though Mr Bruce informs us of a written account at Shoa, in which it was asserted, that he was dissuaded from it by certain monks, who told him, that by sending down such a quantity of water to the eastern and dry parts of Africa, these countries would soon become so fertile and populous that they would rival the empire of Ethiopia, or at least withdraw their allegiance from it entirely. The remains of these works were seen by the Portuguese ambassador in 1522.

All this time the princes of the line of Solomon had been obliged to content themselves with the sovereignty of the province of Xoa or Shoa, without making any attempt to regain their former dignity; but they were unexpectedly restored without bloodshed or disturbance by Naacueto Laeb the grandson of Lalibala. This prince, who was of a gentle and pacific disposition, was persuaded by a monk named *Tecla Haimanout*, much celebrated for his sanctity, to resign the crown, to which, though he received it from his father, he could not pretend any absolute right. In consequence of the mediation of this monk, therefore, it was agreed that Naacueto should give up the empire to Icon Amlac the lineal descendant of Solomon, who then possessed the sovereignty of Shoa. In consequence of this a portion of lands should be irrevocably and irredeemably assigned to him and his heirs; and he should likewise be allowed some marks of sovereignty as a testimony of his former grandeur. In this treaty, however, the good monk did not forget his own interest. He had founded a famous monastery in Shoa, and was primate of the whole empire under the title of *Abuna*. He now insisted that one third of the kingdom should be absolutely ceded to himself for the maintenance of his own dignity, and the support of the clergy, convents, &c. throughout the country; he also insisted that no native Abyssinian should ever enjoy the same dignity with himself, even though he should have been chosen and ordained at Cairo, as was the custom with the Abyssinian prelates.

These extraordinary terms were complied with, and Icon Amlac raised to the throne of Ethiopia. He did not, however, remove the seat of government from the province of Shoa; but continued at Tegulat the capital of that province during the whole of his lifetime, which continued 15 years after his accession to the throne. We are ignorant of the transactions of his reign, as well as that of several of his successors; five of whom ascended the throne in as many years. From this quick succession Mr Bruce is of opinion, that a civil war had taken place among the candidates for the throne: but the Abyssinian annals make no mention of this; neither have we any particular account of the transactions of the empire till the time of Amda Sion, who began to reign in 1312. He was the son of We- Reign of dem Araad, the youngest brother of Icon Amlac, and succeeded to the throne on the death of his father. He professed the Christian religion; but his practice seems

Abyssinia

Restoration of the line of Solomon.

Uncertainty of the Abyssinian history.

Reign of Amda Sion.

^{Abyssinia.} seems to have been very opposite to its precepts. He began his reign with living publicly with a concubine of his father's: and quickly after committed incest with his two sisters. On this he was first exhorted to repentance, and then excommunicated, by Honorius, a monk greatly celebrated for his sanctity, and who has since been canonized. The prince, enraged at this indignity, caused the saint to be severely whipped through every street of his capital. That night the town was by some unknown means set on fire and reduced to ashes: the clergy persuaded the people, that the blood of Honorius had turned to fire as it dropped on the ground, and thus occasioned the catastrophe; but the king suspecting that the monks themselves had been the incendiaries, banished or imprisoned them all, so that their hopes of exciting an insurrection were disappointed; and being dispersed into those provinces where the inhabitants were mostly Jews or Pagans, they were now obliged to apply to what was certainly more incumbent upon them, viz. the diffusion of the knowledge of the gospel.

While the king was busied with the monks, one of the factors, who had been entrusted with some of his commercial interests, was assassinated by the Moors in the province of Ifat; on which, without making the least complaint or expostulation, he assembled his troops, and with *seven* horsemen (A) fell upon the nearest Mahometan settlements, massacring all he met without exception. Putting himself then at the head of his army, he proceeded in the most rapid career of desolation, laying waste the whole country with fire and sword, and carrying off an immense booty.

For some time the Moors were so surpris'd that they did not think of making opposition; but at last they took up arms, and attempted to surpris'e the Abyssinian monarch in his camp, hearing that he had sent out most of his army in detachments. With this view they approached the camp in the night time, expecting to have found the king and his few soldiers immersed in sleep. Unexpectedly, however, he had been joined by a considerable part of his army, whom he drew up in battle array to receive his enemies. An engagement ensued, in which the king behaved with great valour; killed the Moorish general with his own hand, and gained a complete victory. He then commanded such of his soldiers as could not find houses ready built, to build huts for themselves, and a large tract of land to be plowed and sown, as if he meant to stay in the country of the enemy during the rainy season. The Mahometans now perceiving that they were in danger of being totally exterminated, willingly submitted to the terms, he pleased to impose upon them; while the monarch conciliated the affections of his people by dividing among them the vast plunder he had acquired in this expedition.

The Moors no sooner found themselves freed from any apprehensions of immediate danger, than they prepared for a new revolt. The king having intelligence

of their designs, secretly prepared to subdue them before they could have time to bring their matters to a sufficient bearing. The Moors, however, being better prepared than he expected, began hostilities by surpris'ing and plundering some villages belonging to the Christians, and destroying their churches. A most formidable combination had taken place; and as the consequence of allowing the confederate rebels to join their forces might have been very dangerous, the king used his utmost endeavours to prevent it. This design was in some measure facilitated by the superstition of Amano king of Hadea, one of the principal rebels. This man, by the advice of a conjurer in whom he put great confidence, instead of marching his troops to the assistance of his allies, remained at home with them, where he was defeated and taken prisoner by a detachment of the king's army. The governor of Am-hara was next despatched against Saber-eddin the revolted governor of Fatigar, with orders to lay waste the country, and use every method to force him to a battle, if he should be disinclined to venture it himself.

These orders were punctually executed; Saber-eddin was compelled to stand an engagement, in which he was defeated; the victors plundered his house and took his wife and children prisoners. But in the mean time intelligence was received of a new revolt among the Falasha, who had assembled a great army, and threatened to become very formidable; their chief keeping a close correspondence with Saber-eddin, as well as with the king of Adel. These, however, shared the same fate with the rest, being entirely defeated by Tzaga Christos another Abyssinian general, who soon after joined the king with his whole army. This proved fatal to the rebel cause: Saber-eddin, no longer able to support himself against the royal forces, was obliged to surrender at discretion, and all the rest were quickly reduced; so that the king was at leisure to march against the kings of Adel and Mara, who having now united their forces, resolved to give him battle. At this the Abyssinian monarch was so exasperated, that he determined to take a most ample vengeance on his enemies. In the presence of his whole army, therefore, and a monk of uncommon sanctity dressed in the same habit in which he usually performed divine service, the king made a long speech against the Mahometans. He recounted the many violences which they had committed; and of which the kings of Adel and Mara had been principal promoters. He enumerated many examples of murder, sacrilege, &c. of which they had been guilty; setting forth also that they had carried off great numbers of Christians into slavery, and that the view of making slaves was now a great motive with them for making war. He disclaimed every idea of commencing hostilities from any avaricious motive; as a proof of which, he denied that he would accept of any part of the plunder for his own use; concluding with a declaration, that he was now about to swear on the holy eucharist, that, "though

(A) On this Mr Bruce remarks, that "it has been imagined the number should be increased to 70; but there would be little difference in the rashness of the action." The word in the Abyssinian annals which he translates is *seven*; but if we increase the number at all, it ought more probably to be *seven hundred* than seventy.

^{Abyssinia.} but 20 of his army should join him, he would not turn his back upon Adel or Mara, till he had either forced them to tribute and submission, or entirely extirpated them and annihilated their religion." After this speech, he took the oath in the presence of the whole army; who not only applauded him with loud shouts, but protested that they looked upon themselves to be all bound by the oath he had taken. As he had mentioned in his speech that the plunder had been purchased by the lives of their Christian brethren, they determined to show their abhorrence at keeping any of it on these terms. Taking lighted torches in their hands, therefore, they set fire to the whole plunder that had been amassed since the beginning of the war; and having thus reduced themselves to a state of poverty, they prepared to show their Christianity by thirsting, not after the wealth, but the blood of their enemies.

Enthusiasm
of his
troops.

Excessive
superstition
of both parties.

Notwithstanding the enthusiasm of the whole army on this occasion, the expedition was attended with great difficulties. These arose principally from superstition; and as, on the one hand, the Abyssinians were by this principle laid under considerable disadvantages, their adversaries on the other enjoyed equal advantages from no better cause. The Abyssinians, according to Mr Bruce, are very credulous with respect to genii or spirits which go about doing mischief in the dark. Hence they are afraid of travelling, but especially of fighting, in the night-time; because they imagine that the world is then entirely given up to these beings, who are put out of humour by the motions of men, or of any other terrestrial creature. In the night-time therefore an Abyssinian dares not even throw a little water out of a basin, lest it should fall upon some spirit and provoke it to vengeance. The Moors, on the other hand, though equally fearful, secure themselves against these invisible enemies by means no less ridiculous than the fears themselves. A verse of the Koran, sewed up in leather, and worn round their neck or arm, is sufficient to defy the power of the most mischievous spirit. Under such powerful protection, therefore, they laugh at the terrors of the Abyssinians, and are on all occasions ready to attack them in the night-time, and even prefer that season rather than any other for coming to an engagement. Sensible of this advantage, and encouraged by the little loss which attended even a defeat in these nocturnal encounters, they determined on the present occasion to avoid any pitched battles, and to content themselves with harassing the king's army by continual skirmishes of this kind. Thus, though the Abyssinian monarch had always the advantage, his troops soon began to complain; and, on the commencement of the rainy season, insisted on being allowed to return. This was by no means agreeable to a prince of such a martial disposition as Amda Sion. He therefore told them, that, if they were afraid of rains, he would conduct them to a country where there were none; meaning Adel, which, though likewise within the limits of the tropical rains, has them at another season than that in which they fall in Abyssinia. Thus he persuaded his army again to set forward: but was so grievously harassed by the nocturnal attacks of the Moors, that he was once more in danger of being deserted; and when by his eloquence he had found means to dissipate the apprehensions of the soldiers, he

The king's
troops har-
rassed.

was seized with a violent fever which threatened his life. The soldiers now expected that they were soon to return; but while they indulged themselves in the carelessness which usually attends an expectation of this kind, they accidentally received intelligence that the Moors, having assembled an army of 40,000 men, were in full march to attack them, and at a very small distance. The king was now free from fever, but so weak that he fainted on attempting to put himself in readiness for going out to battle. Still, however, his resolution continued firm and unalterable; having recovered from his faint, washed and refreshed himself, he made a speech to his soldiers, filled with the most enthusiastic expressions of confidence in the justice and goodness of the cause in which he was engaged, and in the continuance of the divine favour and protection. "As it never was my opinion (said he), that it was my own strength and valour, or their want of it, which has so often been the cause of preserving me from their hands; so I do not fear at present that my accidental weakness will give them any advantage over me, as long as I trust in God's power as much as I have ever done." By this speech the drooping spirits of the Abyssinians were revived; and they only begged that their monarch would now trust to the valour of his troops, and not expose his person to such danger as he had usually done. He promised to comply with their request; but matters were soon thrown into confusion by a report that the Moors had poisoned the wells and enchanted all the running water in the front of the army. The poisoned wells, however, were easily avoided; and a priest of vast sanctity was dispatched a day's journey before the army to disenchant the waters by his blessings; which, having the advantage of the good qualities of the element itself on their side, were doubtless more powerful than the spells of the infidels. Not content with this, the king caused a river to be consecrated by the name of *Jordan*; but while his men were employed in bathing themselves in this holy water, the *Fis-Auraris*, an officer who had been dispatched with a party of men who always go before the Abyssinian armies, was attacked and driven back on the main body by a detachment of the enemy, who had along with them a number of women provided with drugs to poison and spells to enchant the waters. A dreadful panic now seized the whole army. Unmindful of the promises made to their king, they not only refused to advance, but for the most part resolved to leave the camp, and return homewards without delay. The king, sensible that all was lost if this pernicious scheme should be adopted, did his utmost to encourage and persuade them to return to their duty; but perceiving that nothing was to be gained by reasoning with men so much terrified, he only requested that such as could not be induced to fight, would not leave their places, but stand quiet spectators of the battle. Even this had very little effect: so that, finding the enemy now ready to make an attack, he ordered his master of the horse, with only five others, to attack the left wing of the enemy; while he, with a small party of his servants, made an attack on the right. This desperate action was attended with success. The king, notwithstanding the weakness he yet laboured under, killed with his own hand two of the commanding officers of the enemy's right wing; while his son dispatched another

^{Abyssinia.}
The king is
seized with
a dangerous
fever.

His troops
dishearten-
ed.

Struck
with a pan-
ic, they
refuse to
engage.

He begins
the fight
with a very
few attend-
ants.

Abyssinia. ther of considerable rank belonging to the left. This had such an effect upon the whole Moorish army, that they began evidently to lose courage; while the Abyssinians, ashamed of their conduct, now rushed furiously on to rescue their prince from danger. The battle continued for some time with great obstinacy; but at last the centre and left wing of the Moors were entirely defeated. The right wing, composed principally of Arabians, retired in a body; but not knowing the country, they entered a deep valley surrounded by perpendicular rocks entirely covered with wood. The Abyssinians, imagining they had nothing more to do, began to strip and mangle the bodies of the killed and wounded; but the king, perceiving that the Arabians had brought themselves into a situation from whence they never could be extricated, obliged his soldiers to desist from this barbarous employment, and even killed

The Moors defeated,

two of them who disobeyed his orders. The army was then divided into two parts, one of which surrounded the devoted Arabians, while the other was sent a day's journey after the remainder of the Moors. Both parties proved equally successful. The king, with part of his division, attacked the Arabians in front, while the rest rolled great stones down from the tops of the rocks upon them. By this they were thrown into such confusion, that being neither able to fly nor resist, they were all killed to a man. The fate of the Moors was little better. The other division of the Abyssinian army found them lying round a large pool of water, which they lapped like as many dogs. In this helpless situation there was nothing requisite but to order them to be slaughtered; and this cruel order was punctually executed. The soldiers imagining they should now discharge their vow to heaven, wearied themselves with slaughter; till at last, being almost satiated with blood, they made a few prisoners, among whom was Saleh king of Mara, with his queen; the former of whom was hanged by order of Amda Sion, and the latter cut in pieces, and her body given to the dogs by the soldiers.

This signal victory was gained in the end of July 1316; but as the rains at that season set in with violence, most of the army now again insisted on their returning home without delay. The king and principal officers, however, were of opinion, that the advantages so dearly purchased ought by all means to be pursued till they had either reduced the Mahometans to subjection, or at least deprived them of all power to make attacks on the empire with any prospect of success. This opinion being adopted; the king sent back the baggage, women, and others who could be of no use to the army; retaining only the veteran soldiers, who were able to encounter more than six times the number of such enemies as he could expect to meet with. Advancing farther into the Mahometan territories, he took up his residence in a large town called *Zeyla*; from whence he, that very night, sent out a detachment to surprize a large village in the neighbourhood named *Taraca*. This was executed with success; the men were massacred, and the women kept to supply the places of those who had been sent away. Continuing still to advance, he detached parties to lay waste the countries all round; and in this expedition he had the good fortune to cut off two of the principal authors of the conspiracy against him. He then proceeded to

Amda Sion pursues his advantage.

His further conquests.

invade Talab and Abalge in the territories of the king of Adel. That monarch, now rendered desperate by the view of approaching ruin, had assembled all the troops he could raise, in order to make one last effort against the enemy; but conducted himself with much less prudence than he ought to have done when contending with such an experienced and vigilant adversary. Amda Sion, confident of success, took no less care how to prevent the enemy from escaping than how to gain the victory. For this purpose he dispatched parties of horse to lie in wait in all those avenues by which he supposed that the Moors might attempt to make their escape; after which, falling furiously on the Adeliens himself, and being well supported by his troops, he gained a complete victory; the king of Adel, with great numbers of his men, being killed on the spot, and almost all the rest by the parties of horse whom the Abyssinian monarch had posted in ambush to intercept them.

Abyssinia. Adel invaded.

The king of Adel defeated and killed.

As the loss of this battle rendered the affairs of the Adeliens quite desperate, the three young princes, sons of the late king, with their uncle, waited upon Amda Sion with rich presents, which they laid at his feet in the most humble manner putting their foreheads in the dust, and intreating his pardon; professing their subjection and readiness to obey his commands, provided that he would spare the remainder of their country and property. To this the king made a very unfavourable reply, reproaching them with indignities done to himself; but especially with the sacrilege they had committed in burning churches and murdering priests, destroying also defenceless people in villages, merely because they imagined that he would not protect them. To punish these and other crimes, he said, he was now in the heart of their country; and he was determined never to turn his back upon Adel while he had ten men capable of drawing their swords; for which reason he commanded them to return and expect the approach of his army.

The princes of Adel submitted.

By this fierce speech the brother and two eldest children of the king of Adel were so disheartened, that they could not speak; but the youngest son made a very spirited speech, in which he attempted to soften the king by complimenting his valour, and showing that it was unworthy of his character to push the war against the people who were already conquered and defenceless. All the answer he could obtain, however, was, that unless the queen with the rest of the royal family, and the principal people of the nation, would come by to-morrow evening and surrender themselves as the princes had done, he would lay waste the territory of Adel, from the place where he sat to the Indian ocean. On this the princes earnestly requested their mother to submit without reserve to the clemency of the Abyssinian monarch, and to wait upon him next morning; but she was prevented from this by some of the nobility who had formerly advised the war, and who justly suspected danger to themselves if they should be obliged to submit unconditionally to the conqueror. They resolved, therefore, once more to venture a battle; and the better to ensure success, they bound themselves by an oath to stand by each other to the last extremity. At the same time they dispatched messengers to the princes, requesting them to make their escape with all manner of expedition, and to head the army themselves;

Are unfavourably received.

The war continues.

Abyssinia. all of whom were determined to conquer or die as soon as the royal family should be out of the enemy's hands. By this conduct the Abyssinian monarch was so much irritated, that he divided his army into three parts; two of which he commanded to enter the territory of the enemy by different routes, and to exterminate both man and beast wherever they came; while he himself, with the third, took the straight road to the place where the new Adelian army was encamped. Here he found a number of infantry drawn up and ready to engage him; but, besides these, there was a multitude of old men, women and even children, all armed with such weapons as they could procure. Surprised at this sight, he ordered a party of horse to disperse them; but this was found impossible; so that he was obliged to call in the detachments he had sent out, with orders to fall upon the enemy by the nearest way they could advance. The engagement was for a long time very doubtful; and in opposition to Amda Sion appeared the young king of Wyppo, who everywhere encouraged his troops, and made the most obstinate resistance. The Abyssinian monarch having observed him, sheathed his sword, and arming himself with a bow, chose the broadest arrow he could find, and took so just an aim, that he shot the young prince through the side of the neck, and his head inclining to one shoulder he soon fell down dead. On this the spirit of the Adelians entirely forsook them, and they betook themselves to flight; but unluckily falling in with two Abyssinian detachments coming to the king's relief, they were so completely destroyed, that only three of them are said to have made their escape. On the side of the Abyssinians, however, the victory was dearly purchased; many of the principal officers being killed, and scarcely one of the cavalry escaping without a wound.

An obstinate battle.

The Moorish army entirely cut off.

Dreadful devastations.

The royal family not confined as formerly.

Reign of Saif Araad.

Of Theodor.

The remainder of this expedition consisted only in the destruction and burning of towns and villages, and massacres of helpless people, on pretence of retaliating the injuries committed by the Mahometans against the Christians. At last, weary of conquest and of carnage, this victorious monarch, who never suffered a defeat in any battle, returned in triumph to his capital, where he ended his days after a reign of 30 years. In his time we find that the royal family were not confined, as had been the usual practice from the time of the queen of Sheba to the massacre by Judith; for Saif Araad, the son and successor of Amda Sion, distinguished himself in one of the battles in which his father was engaged.

Though the new prince, as appears from what has been just now observed, was by no means destitute of military talents, the Abyssinian empire enjoyed a profound peace during his reign. The only remarkable transaction was the relief given by him to the Coptic patriarch, whom the sultan of Egypt had thrown into prison. At this time a great trade was carried on through the desert by caravans between Cairo and Abyssinia, as well as from Cairo to Suakem on the Red sea; but the Ethiopic monarch having seized the merchants from Cairo, and sent parties of horse to interrupt the caravans in their passage, the sultan was soon content to release the patriarch, whom he had imprisoned only with a view to extort money.

In the reign of Theodorus, who held the crown of Ethiopia from the year 1409 to 1412, we find an in-

fringement made on the treaty between Icon Amlac and the Abuna Tecla-Haimanout formerly mentioned. By that treaty the Abuna was to have a full third of the whole empire for the support of his own dignity and that of the church: but Theodorus, justly considering this as an unreasonable acquisition; reduced it very considerably, though he still allowed a very ample revenue out of every province of the empire; and even this has been considered by several of his successors as far too large, and consequently has been frequently abridged by them. The annals of this prince's reign are very defective, and Mr Bruce supposes that they have been mutilated by the ecclesiastics; which, considering what we have just now related of his reducing their revenues, is by no means improbable. By his subjects he was considered as such a saint, that to this day the people believe he is to rise again and to reign a thousand years in Abyssinia; during which period war is to cease, and happiness to be universally diffused.

Abyssinia.

Is celebrated as a saint.

From the time of Theodorus to that of Zara Jacob who began his reign in 1434, the Abyssinian annals furnish us with little or nothing of any consequence. The character of this prince is represented as by no means inferior to that of Theodorus, or indeed of any monarch that ever sat on the throne of Ethiopia, or any other kingdom in the world. He is, in short, set forth as another Solomon, and a model of what sovereigns ought to be; though, from some particulars of his reign, his character should seem to be rather exaggerated. The first remarkable transaction of this great monarch was his sending an embassy to the council of Florence. The ambassadors were certain priests from Jerusalem, who in that assembly adhered to the opinions of the Greek church; and the embassy itself was judged to be of such consequence as to be the subject of a picture in the Vatican. This prince obtained also a convent at Rome from the pope for the use of the Abyssinians; which is still preserved, though very seldom visited by those for whom it was designed. He seems to have been very desirous of keeping up a correspondence with the Europeans as well as the Asiatics; and in his time we first read of a dispute in Abyssinia with the Frangi or Franks on the subject of religion. This was carried on in presence of the king between one Abba George and a netian painter, Francisco de Branco Lone, in which the former confuted and even convinced his antagonist; but from this time we find a party formed for the church of Rome, and which probably took its rise from the embassy to the council of Florence.

Zara Jacob is said to equal Solomon.

Sends an embassy to the council of Florence.

A party formed for the church of Rome.

The prince of whom we now treat was the first who introduced persecution on a religious account into his dominions; and for this reason, most probably, he is so highly commended by the ecclesiastics. The state of Religion in Abyssinia was now indeed very corrupt, and the Greek profession had been originally established from the church of Alexandria; but in the low provinces bordering on the coast of Adel, the Mahometan superstition prevailed. Many of that persuasion had also dispersed themselves through the towns and villages in the internal parts of the empire, while in not a few places the grossest idolatry still took place; such as the worship of the heavenly bodies, the wind, trees, cows, serpents, &c. All this had hitherto passed unnoticed; but in the reign of Zara Jacob, some families

Religious persecution introduced.

Abyssinia. lies being accused of worshipping the cow and serpent, were brought before the king, who pronounced sentence of death upon them. Their execution was followed by a royal proclamation, that whoever did not carry on his right hand an amulet with these words upon it, "I renounce the devil for Christ our Lord," should not only forfeit his personal estate, but

Amda Sion a cruel inquisitor.

be liable to corporal punishment. The spirit of persecution thus begun, quickly diffused itself, and an inquisitor was appointed to search for criminals. This was one Amda Sion, the king's chief confidant, who pretended to all that absurd and austere devotion common to religious hypocrites. In this he was flattered with uncommon parade and attendance, the usual rewards of people of that stamp; as he never appeared abroad but with a great number of soldiers, trumpets, drums, and other ensigns of military dignity waiting upon him. He kept also a number of spies, who brought him intelligence of those who were secretly guilty of any idolatrous or treasonable practices; after which, proceeding with his attendants to the house of the delinquent, he caused the family first supply himself and his party with refreshments, and then ordered the unhappy wretches to be all put to death in his presence. Among those who suffered in this barbarous manner were the two sons-in-law of the king himself, who had been accused by their wives, the one of adultery, and the other of incest; on which slight ground they were both put to death in their own houses in such a manner as deservedly threw an odium on the king. His conduct was afterwards so severely condemned by a certain clergyman from Jerusalem, that a reformation seems to have been produced; and no mention is afterwards made of the inquisitor or persecution during this reign.

Murder of the king's sons-in-law.

Persecution suppressed.

Affairs of the kingdom regulated.

The attention of the king was now called off from religion to the state of his affairs in the different provinces of the kingdom. As the Moorish provinces were very rich, by reason of the extensive trade they carried on, and frequently employed their wealth in exciting rebellions, it became necessary that the sovereign himself should examine into the circumstances and dispositions of the several governors; which was likewise proper on another account, that he might assign to each the sum to be paid. On this occasion he divided the empire more distinctly, and increased the number of governments considerably; which being done, he set about repairing the churches throughout the country, which had fallen into decay, or been destroyed in the war with the Mahometans. So zealous was he in this respect, that having heard of the destruction of the church of the Virgin in Alexandria by fire, he instantly built another in Ethiopia, to repair the loss which Christianity might have suffered.

Churches repaired.

The last public transaction of this prince's reign was the quashing of a rebellion which some of his governors had entered into; but whatever glory he might acquire from this or any other exploit, his behaviour with regard to his domestic affairs must certainly place him in a very disadvantageous light. In the decline of the king's life, the mother of the heir-apparent conceived such an extreme desire to behold her son in possession of the throne, that she began to form schemes for obliging his father to take him into partnership with him in the government. These being discovered,

The queen put to a cruel death.

her husband cruelly caused her to be whipped to death: and finding that his son afterwards performed certain solemnities at her grave in token of regard for her, he caused him to be loaded with irons and banished to the top of a mountain; where he would probably have been put to death, had not the monks interfered. These having invented prophecies, dreams, and revelations, that none but the young prince Bæda Mariam was to possess the throne, the old king submitted to the decrees of Heaven, and relaxed in his severity.

Abyssinia.

On the accession of the new king in 1468, the old law for imprisoning all the royal family was revived, and a mountain named *Geshen* chosen for the purpose. Having thus secured himself from any danger of a rival in case he should undertake a foreign expedition, he proclaimed a pardon to all those who had been banished during the former reign, and thus ingratiated himself with his people: after which he began to prepare for war. At this the neighbouring princes, particularly the king of Adel, being alarmed, sent ambassadors requesting the continuance of peace. The Abyssinian monarch told them, that his design was to destroy the Dobas; a race of shepherds very wealthy, but extremely barbarous, professing the Pagan religion, and greatly resembling the Gallas. The reason of his commencing hostilities against them was, that they made continual inroads into his country, and committed the greatest cruelties; on which account he determined not to make war as with a common enemy, but to exterminate and destroy them as a nuisance. The king of Adel was no sooner possessed of this piece of intelligence, than he communicated it to the Dobas; desiring them to send their women and children, with their most valuable effects, into his country, till the invasion should be over. This proposal was readily embraced; but Bæda having got notice of it, seized an avenue through which they must necessarily pass, and massacred every one of the company. After this, entering their country, he committed such devastations, that they were glad to submit, and even to renounce their religion in order to free themselves from such a dreadful enemy. The king then turned his arms against Adel, where he was attended with his usual success; a most complete victory being gained over the Moors by the Abyssinian general: but while the king himself was advancing towards that country, with a full resolution to reduce it to the most abject state of misery, he was seized with a pain in his bowels, which occasioned his death.

The royal family again confined.

War with the Dobas resolved on.

They are massacred.

Death of the king.

The discovery of the kingdom of Ethiopia or Abyssinia by the Europeans took place about this time. It has already been observed, that some intercourse by means of individuals had been carried on betwixt this country and Italy; but the knowledge conveyed to Europeans in this manner was very imperfect and obscure. Even the situation of the country had been forgot; and though some confused notions were entertained of a distant Christian prince who was likewise a priest, Marco Paulo, the famous Venetian traveller, affirms that he had met with him in Tartary; and it was universally agreed that his name was *Joannes Presbyter*, *Prete Janni*, or *Prester John*. When the Portuguese began to extend their discoveries along the coast of Africa, more certain intelligence concerning this prince was obtained. Benoy, one of the kings of the

Discovery of Abyssinia by the Europeans.

Of Prester John.

Abyssinia.

Ambassadors sent from the King of Portugal.

Account of their travels.

Important intelligence conveyed to Portugal by Covillan.

Reign of Alexander.

Meditates a war against Adel.

the Jaloffes, a nation on the western coast of Africa, had assured the Portuguese navigators of the existence of such a prince so strongly, that the king determined to send ambassadors to him; and the discovery was of the greater consequence, that a passage to the East Indies was now attempted both by land and sea. The ambassadors were named *Peter Covillan* and *Alphonso de Paiva*. These were sent to Alexandria in Egypt, from whence they were to set out on their journey; the intent of which was, to explore the sources of the Indian trade, the principal markets for the spice, &c. but above all, to discover whether it was possible to arrive at the East Indies by sailing round the continent of Africa.

In the prosecution of this scheme our two travellers went from Alexandria to Cairo; from thence to Suez at the bottom of the Red sea; from Suez they took their route to Aden, a wealthy and commercial city beyond the straits of Babel Mandel. Covillan now set sail for India, and De Paiva for Suakem. The latter lost his life without making any discovery; but Covillan passed over to Calicut and Goa. From thence he returned to the continent of Africa, visiting the gold mines of Sofala, and passing from thence to Aden and Cairo; at which last place he was informed of the death of his companion. In this city he was met by two Jews with letters from the king of Abyssinia. One of these Jews was sent back with letters to the Abyssinian monarch; but with the other he proceeded to the island of Ormus in the Persian gulf. Here they separated; the Jew returning home, and Covillan repassing the straits of Babel Mandel, whence he proceeded to Aden, and afterwards entered the Abyssinian dominions.

The reigning prince at this time was named *Alexander*; and when Covillan arrived, he was employed in levying contributions upon his rebellious subjects. He met with a kind reception; and was conveyed to the capital, where he was promoted to the highest posts of honour, but never allowed to return to Europe again. The intelligence, however, which he transmitted to the court of Portugal proved of much importance. He not only described all the ports of India he had seen, with the situation and wealth of Sofala, but advised the king to prosecute the discovery of the passage round Africa with the utmost diligence; affirming, that the Cape at the southern extremity of the continent was well known in India; and accompanying the whole with a chart which he had obtained from a Moor, which showed exactly the situation of the Cape and neighbouring countries.

Covillan arrived in Ethiopia about the year 1490; and the prince to whom he addressed himself was Alexander the son of Bedia Mariam, a prince endowed with many good qualities, and no less versed in military affairs than any of his predecessors. His reign was disturbed by plots and rebellions, which at last proved fatal to him. From his early years he manifested a great desire to make war on the king of Adel, who seems to have been the natural rival of the Ethiopian princes. But the Adelian monarch, having now become sensible that he was not able to cope with such powerful adversaries, took the most effectual way of securing himself; viz. by gaining over a party at the court of Abyssinia. In this he had now succeeded so

well, that when Alexander was about to invade Adel, Za Saluce the prime minister, with many of the principal nobility, were in the interest of his adversary.

Not being apprized of this treachery, however, Alexander intrusted this minister with the command of a great part of his forces; and with these the latter abandoned him in the heat of an engagement. Alexander and the few troops who remained with him, however, were so far from being disheartened by this treachery, that they seemed to be inspired with fresh courage. The king having killed the standard-bearer of the enemy, and thus become master of the green ensign of Mahomet, the enemy began to give way; and on his killing the king of Adel's son, immediately after, they quitted the field altogether. The victory was not by any means complete; neither was Alexander in a situation to pursue the advantage he had gained. Having therefore challenged the Moors to a second engagement, which they declined, he returned with a design to punish his perfidious minister Za Saluce, who had endeavoured to excite the governors of all the provinces to revolt as he went along. The traitor, however, had laid his plots too well; so that his sovereign murdered in two days after his arrival in the capital. Za Saluce did not enjoy the rewards he expected from his treachery: for having attempted to excite a revolt in the province of Amhara, he was attacked by the nobility there; and his troops deserting him, he was taken prisoner without any resistance, his eyes were put out, and himself exposed on an ass, to the curses and derision of the people.

Alexander was succeeded by an infant son, who reigned only seven months; after which his younger brother Naod was chosen king by the unanimous voice of the people. He proved a wise and virtuous prince; but the late misfortunes, together with the corruption introduced at court by the Mahometans, had so unhinged the government, that it became very difficult to know how to manage matters. Judging very properly, however, that one of the most effectual methods of quieting the minds of the people would be an offer of a general pardon; he not only proclaimed this, but likewise, "That any person who should upbraid another with being a party in the misfortunes of past times, or say that he had been privy to this or that conspiracy, had received bribes from the Moors, &c. should be put to death without delay." On his entering upon government, he found it necessary to prepare against an enemy whom we have not heretofore mentioned, viz. Massudi, prince of a district named *Awar*, which lay in the neighbourhood of Adel. This chieftan being a man of a very enterprising and martial disposition, and a most violent enthusiast in the Mahometan cause, had made a vow to spend 40 days annually in some part of the Abyssinian dominions during the time of Lent. For this purpose he kept a small body of veteran troops, with whom he fell sometimes on one part, and sometimes on another of the frontiers, putting to death without mercy such as made resistance, and carrying off for slaves those who made none. For 30 years he continued this practice; beginning exactly on the first day of Lent, and proceeding gradually up the country as the term advanced. His progress was greatly facilitated by the superstition of the people themselves, who kept that fast with such rigour as almost

Abyssinia.

He is deserted by his prime minister and most of his army in battle, but gains a victory.

Alexander was murdered.

Reign of Naod.

Massudi ravages the Abyssinian territories.

Abyssinia. most entirely to exhaust their strength; so that Maffudi having never met with any opposition, was always sure of success, and thus came to be reckoned invincible.

He is defeated.

On the present occasion, however, he experienced a prodigious reverse of fortune. Naod having enjoined his soldiers to live in the same full and free manner during the fast as at any other time, and having set the example himself, marched out against his enemy; who, being ignorant of the precaution he had taken, advanced with his usual confidence of success. The Abyssinian monarch, still pretending fear, as if on account of the weakness of his men, pitched his camp in very strong ground, but left some passages open to it, that the enemy might make an attack. This was done contrary to the advice of their leader; and the consequence was, that almost every one of them was cut off. On this the king of Adel sent ambassadors to solicit a continuance of the peace with himself; which was granted, upon condition that he restored all the slaves whom Maffudi had carried off in his last year's expedition; with which the Mahometan chief thought proper to comply rather than engage in such a dangerous war.

Naod having thus freed his country from the danger of any foreign invasion, applied himself to the cultivation of the arts of peace, and reforming the manners of his subjects, in which he spent the remainder of his days. He died in 1508, after a reign of 13 years; and was succeeded by his son David III. a child of 11 years of age. Though the affairs of the empire were at present in such a state as required a very prudent and active administration, the empress Helena, widow of Bæda Mariam, had interest enough to get the crown settled on the infant just mentioned. This proceeded partly from her desire of engrossing all the power into her own hands, and partly from a wish to keep peace with Adel her native country. These ends could not be accomplished but by keeping a minor on the throne of Abyssinia; which was therefore her constant object as long as she lived. But though this might not have been attended with any very bad consequence had the two nations been left to decide the quarrel by themselves, the face of affairs was now quite changed by the interference of the Turks. That people having now conquered almost the whole of Arabia to the Indian ocean, being likewise on the point of reducing Egypt, and having a great advantage over their adversaries in using fire-arms, now projected the conquest of India also. In this indeed they were always disappointed by the superior valour of the Portuguese; but as this conquest remained a favourite object with them, they did not abandon their attempts. In the countries which they had conquered, they exacted such enormous contributions from the merchants, that vast numbers of them fled to the African side of the Red sea, and settled on the coast of Adel. The Turks, surprised at the increase of trade in this country, which they themselves had occasioned, resolved to share in the profits. For this purpose they took possession of Zeyla, a small island in the Red sea, directly opposite to the coast of Adel; and erected a customhouse in it, where they oppressed and ruined the trade as in other places. Thus both Adel and Abyssinia were threatened with a most formidable enemy, which it would have been utterly out of their power to have resisted, had not the

David III.

Abyssinia in danger from the Turks.

desire of possessing India constantly prevented the Turks from directing their strength against these countries. Helena was sensible enough of the dangerous situation of the empire, but preferred the gratification of her ambition to the good of her country; however, that she might preserve herself from the attacks of such a formidable enemy, it was now thought proper to enter into an alliance with the Portuguese. The ambassador from Portugal, Peter Covillan, was denied the liberty of returning to his own country, as has been already related; and as, for some time past, it had not been obvious how he could be of much use, he had begun to fall into oblivion. The present emergency, however, recovered his importance. The empress was sensible of the necessity she lay under of having some person who understood both the Abyssinian and Portuguese languages before she could open any correspondence with that nation, and who might likewise inform her of the names of the persons to whom her letters ought to be addressed. By him she was now instructed in every thing necessary to the success of her embassy. The message was committed to one Matthew an Armenian merchant, with whom a young Abyssinian was joined; but the latter died by the way. The letters they carried are by Mr Bruce supposed to have been partly the work of Covillan and partly of the less experienced Abyssinian confidants of the empress. They began with telling the king, that Matthew would give him information of her whole purpose, and that he might depend on the truth of what he said; but in the latter part the whole secret of the embassy was disclosed, and a force sufficient to destroy the Turkish power was expressly solicited. Among the other particulars of this embassy also it is said, that a third part of Abyssinia was offered in case her requisitions were complied with; but this, as well as the embassy itself, was always denied by David when he came of age.

Matthew, though raised from the rank of merchant to that of an ambassador, could not, it seems, act according to his new dignity in such a manner as to screen himself from the most mortifying and dangerous imputations. Having arrived at Dabal in the East Indies, he was seized as a spy, but relieved by Albuquerque the viceroy of Goa; and that not out of any regard to his character as ambassador, but because he himself had a design upon Abyssinia. This viceroy used his utmost endeavours to induce Matthew to deliver his commissions to him; but the ambassador constantly refused to show any letter he had, except to the king of Portugal in person, and in his own kingdom. This put him out of favour with the viceroy; while his attendants, displeased at the mean appearance of the man, insisted sometimes that he was a spy from the sultan, at others that he was a cook, an impostor, or a menial servant. Matthew, however, perceiving that he was now out of danger, maintained that his person was sacred, and insisted on being treated as the representative of a sovereign. He let the viceroy, bishop, and clergy know, that he had with him a piece of the wood of the true cross, sent as a present to the king of Portugal; and he required them, under pain of sacrilege, to pay respect to the bearer of such a precious relic, and to celebrate its arrival as a festival. This was instantly complied with, and a solemn procession instituted; but very little regard

Abyssinia. An embassy sent to Portugal.

The ambassador ill used.

Abyffinia.

gard appears to have been paid to this ambaffador either in his temporal or fpiritual character, as he could not obtain leave to depart for Portugal till 1513, which was three years after he arrived in India. In his paffage he was extremely ill-treated by the fhipmafters with whom he failed: but of this they foon had caufe to repent; and on their arrival at Lifbon they were all put in irons, and would probably have died in confinement, had not Matthew made intercession for them with the king.

Maffudi re-
news his
depre-
dations.

In the mean time, Maffudi having recovered from the defeat given him by Naod, and formed alliances with the Turks in Arabia, had renewed his depredations on the Abyffinian territories with more fuccefs than ever. Such a number of flaves had been, by his affiduity, fent to Mecca, that he was honoured with a green filk ftandard (an emblem of the true Mahometan faith), with a tent of black velvet embroidered with gold, and he was likewife made Sheykh of Zeyla; fo that, as this ifland was properly the key to the Abyffinian empire, he could neither be rewarded with greater honour nor profit. This happened when David had attained the age of 16; and in confequence of fuch furprifing fuccefs, the king of Adel, never a hearty friend to Abyffinia, determined to break the peace with that empire and make an alliance with Maffudi. Having taken this refolution, the two princes invaded Abyffinia with their joint forces, and in one year carried off 19,000 Chriftian flaves, fo that a general terror was fpread over the whole empire. David, already impatient of the injuries his people had fufained, determined to raife an army, and to head it in perfon as his anceftors had done, contrary to the advice of the emperfs, who confidering only his youth and inexperience in military affairs, wifhed him to have employed fome of his veteran officers. A very powerful army was raifed, and ample fupplies of all kinds were procured. With one part of his forces the emperor

David
marches a-
gainft him.

took the road to Aufla the capital of Adel; fending the other under the command of an officer named the *Betwudet*, to meet the Moorifh army, which was then ravaging part of Abyffinia. It was natural to be imagined, that the Moors, on hearing that an army was marching to deftroy the capital of their country, would abandon the thoughts of conqueft or plunder to preferve it. In doing this, David knew that they had certain defiles to pafs before they could reach Adel. He ordered the *Betwudet* therefore to allow them to enter thefe defiles; and before they could get through, he himfelf, with the main body of the army, marched to attack them at the other end. Thus the Moors were completely hemmed in by a fuperior army: but befides this unfavourable fituation, they were farther difpirited by Maffudi. That hero came, on the morning of the engagement, to the king of Adel, informing him that his own time was now come; that he had been certainly told by a prophet, long ago, that if this year (1516) he fhould fight the king of Abyffinia in perfon, he fhould lofe his life. He was affured that the Abyffinian monarch was then prefent, having feen the fcarlet tent which was ufed only by the fove-

Maffudi
prophefies
his own
death.

reigns of that country; and therefore advifed the king of Adel to make the beft of his way over the leaft fleep part of the mountain before the engagement began. The Adelian monarch, who had at any rate no great inclination to fight, was not infpired with courage by this fpeech: he therefore followed the advice given him; and, with a few of his friends, paffed the mountain, leaving his troops to their fate. The Moors, in the mean time, being abandoned by one leader, and having another devoted to deftruction, fhewed an uncommon backwardnefs to engage, which was taken notice of by their enemies. Maffudi, however, as foon as he fuppofed the king of Adel to be out of danger, fent a trumpet to the Abyffinian camp, with a challenge to any man of quality in the army to fight him; on condition that the party of the victorious champion fhould be accounted conquerors, and that the armies fhould immediately feparate without further bloodfhed. The challenge was infantly accepted by a monk named *Gabriel Andreas*; who, in the reign of Bæda Mariam, had been condemned to lofe the tip of his tongue for fpeaking flightly of the king's proclamation of amnefty. Maffudi fhewed no reluctance to prefent himfelf; but received fuch a ftroke from his antagonift with a two-handed fword as almoft cut his body in two, and he immediately fell down dead. Andreas cut off his head; and throwing it at the king's feet, cried out, "There is the Goliath of the infidels." This became the fignal for a general engagement, notwithstanding the terms ftipulated by Maffudi before the combat. The Moors were quickly repulfed by the king's troops, and driven backward through the defile. At the other end they were met by the *Betwudet* (B), who drove them back to the king's forces; fo that at laft being forced to fly to the mountains, they were all flaugtered by the peafants or perifhed with hunger and thirft.

Abyffinia.

He is killed.

The Moors
defeated
and de-
ftroyed.

The fame day that this victory was gained over the Moors by David, being in the month of July 1516, the ifland of Zeyla in the Red fea was taken and the town burnt by the Portuguefe fleet under Lopez Suarez de Alberguiera. The Abyffinian ambaffador, Matthew, in the mean time, had been received with the greateft marks of efteem in Portugal. The utmoft attention was paid to his embaffy; he was lodged in the moft fplendid manner; and his maintenance was fuitable to his lodging. The king prepared an embaffy on his part, and fent home Matthew on board the Indian fleet commanded by Lopez. The ambaffador ordered for Abyffinia was one Edward Galvan, a man who had filled many ftate departments with the utmoft applaufe; but who by reafon of his age, being now 86, was certainly very unfit for fuch a ditant and perilous voyage. He died accordingly on the ifland of Camaran in the Red fea, where Suarez had imprudently landed, and paffed the winter in the utmoft diftreffes for want of provifions of every kind. This admiral was fucceeded by Lopez de Seguyera; who failed firft to the ifland of Goa in the Eaft Indies, where he fitted out a ftrong fleet; after which he returned to the Red fea, and landed on the ifland of Mafuah, hav-

Embaffy
from the
king of
Portugal.

(B) This is the title of one of the officers in Abyffinia, not the proper name of a man.

Abyflinia. ing along with him Matthew, about the authenticity of whose miffion there had been fuch difputes. At his firft approach the inhabitants fled; but at laft he was accofed by a Chriftian and a Moor from the continent, who informed him that the coaft oppofite to Mahafah was part of the kingdom of Abyflinia, and that it was governed by an officer named the *Baharnaga/b*; that all the inhabitants of the ifland were Chriftians; that the reafon of their flying at the fight of the Portuguefe fleet was that they took them for Turks, who frequently made defcents, and ravaged the ifland, &c. The admiral difmiffed them with prefents; and foon after had a vifit from the governor of Arkeeko, a town on the continent; who informed him, that about 24 miles up the country there was a monaftery, feven of the members of which were now deputed to wait upon him. Thefe infantly knew Matthew, and congratulated him in the warmeft manner upon his return from fuch a long voyage. An interview foon took place between the Baharnagafh himfelf and Lopez. The Abyflinian informed him, that the coming of the Portuguefe had been long expected, in confequence of certain ancient prophecies; and that he himfelf and all the officers of the emperor were ready to ferve him. They parted with mutual prefents; and all doubt about Matthew being now removed, he prepared to fet out for the emperor's court; while Roderigo de Lima was nominated ambaffador in place of Galvan who died. Along with them were 15 Portuguefe; all men of the moft determined courage, and who would hefitate at nothing which they thought might contribute to the glory of their king, their own honour, or the advantage of their country. Their prefent journey indeed was much more perilous than their voyage from Portugal to Abyflinia. The emperor was at this time in the fouthern part of his dominions, but the Portuguefe had landed on the northern part; fo that they had almoft the whole breadth of the empire to pafs before they could meet with him. The very firft journey they attempted was through a wood fo thick that it could fcarce afford a paffage either to man or beaft, while the interftices of the trees were fo interwoven with briars and thorns of various kinds, that their paffage was rendered almoft impracticable. This was rendered ftill more terrible by the vaft numbers of wild beafts they faw, and which feemed only to be prevented from devouring them by the appearance of fo many men together. The rainy feafon was alfo now begun; fo that they were expofed to inceffant deluges of water defcending from the clouds, befides frequent and violent forms of wind, thunder, and lightning, &c. To add to their miffortunes, an epidemic fever broke out among them, which carried off Matthew and one of the fervants of Don Roderigo. At laft, after a moft tedious and toillome journey, from the 16th of April to the 18th of October 1520, the Portuguefe ambaffador, with his retinue, came within fight of the Abyflinian camp at the diftance of about three miles. His reception was by no means favourable; for inftead of being immediately admitted to the prelfence of the emperor, he was waited on by one of the officers of ftate, ftyled, in token of humility, *Hadij Ras*, or *commander of affes*; who caufed him pitch his tent three miles farther off from the camp: and it was not till five years afterwards that he was enabled to finifh the bufinefs

A Portuguefe fleet arrives on the coaft of Abyflinia.

Difficult journey of the ambaffadors through Abyflinia.

Are very indifferently received by the emperor, and long detained.

of his embaffy, and obtained leave to depart for Portugal.

During all this time, not a fingle word had paffed relating to the affairs of the two nations; fo that it is difficult to imagine what might have been the defign of the Abyflinian emperor. At laft, having relolved to fend an embaffy to Portugal, he allowed Roderigo to depart, but detained two of his people; appointing Zaga Zaab, an Abyflinian monk, his ambaffador to dor from Portugal.

This long intercourfe betwixt two fuch diftant nations, however, could not but greatly alarm the Mahometan powers, who were natural enemies to both. Selim, the Turkiſh fultan, having been conftantly defeated by the Portuguefe in the eaft, and alarmed at the thoughts of having a fleet of that nation in the Red fea, where they might greatly annoy his fettlements on the coaft of Arabia, determined to carry his arms to the African fide; while the king of Adel, having ftrengthened himfelf by alliances with the Turkiſh officers in Arabia, was now become a much more formidable enemy than before. This was foon experienced in a battle with the Adeliens; in which the Abyflinian monarch was overthrown with the lofs of almoft all his great officers and principal nobility, befides a vaft number of private men. The victory was principally owing to the affiftance given by the Turks; for the army was commanded by Mahomet furnamed *Gragné*, i. e. *left-handed*, governor of Zeyla, which had now received a Turkiſh garrifon. This man, having the conqueft of Abyflinia greatly at heart, relolved, as foon as poffible, to effect fomething decifive; and therefore having fent to Mecca all the prifoners taken in his late expedition, he obtained in return a confiderable number of janizaries, with a train of portable artillery. Thus the fortune of the war was entirely decided in favour of the Adeliens and Turks; the emperor was defeated in every battle, and frequently hunted from place to place like a wild beaft. The Moors, finding at laft no neceffity for keeping up an army, overran the whole empire in fmall parties, everywhere plundering and burning the towns and villages, and carrying off the people for flaves.

This destructive war continued till the year 1537; when Gragné ſent a meffage to the emperor, exhorting him not to fight any longer againft God, but to make peace while it was in his power, and give him his daughter in marriage: on which condition he would withdraw his army; but otherwife he would reduce his empire to fuch a ftate that it fhould be capable of producing nothing but grafs. David, however, ftill refufed to fubmit; replying, that he put his confidence in God, who at prefent only chaftifed him and his people for their fins; but that Gragné himfelf, being to an infidel, and enemy to the true religion, could not fail of coming in a fhort time to a miferable end. This unſucceffful negotiation was followed by feveral encounters, in which the emperor was conftantly defeated; in one of them his eldeft fon was killed, and in another his youngeft was taken prifoner: fo that he now feemed entirely deſtitute, being obliged to wander on foot, and all alone, hiding himfelf throughout the day among the buſhes on the mountains.

The invincible conftancy with which this forlorn monarch bore his miffortunes, proved a matter of furprife

At laft allowed to depart with an ambaffador from the emperor. Bad effects of this decay. The emperor defeated by the Moors. The Adeliens, affifted by the Turks, defeat the emperor.

He refufes to fubmit.

Abyssinia. prize both to friends and enemies. Many of his veteran soldiers, compassionating the distresses of their sovereign, fought him out in his hiding places; so that he once more found himself at the head of a small army, with which he gained some advantages that served to keep up his own spirits and those of his adherents. His greatest enemy was Ammer, one of Gagné's officers, who headed the rebellious Abyssinians, and who had formed a scheme of assassinating the king; but, instead of accomplishing his purpose, he himself was assassinated in 1538 by a common soldier, on what account we are not informed.

A new embassy to Portugal.

By the death of Ammer and the small successes which David himself had obtained, the affairs of Abyssinia seemed to revive; but still there was no probability of their being ever brought to a fortunate issue. An embassy to Portugal was therefore thought of in good earnest, as the mischievous effects of slighting the proffered friendship of that power were now sufficiently apparent. One of the attendants of Roderigo, named John Bermudes, who had been detained in Abyssinia, was chosen for this purpose; and to his temporal character of ambassador was added that of Abuna, primate or patriarch. John, who was not a Egyptian originally, had received all the inferior ecclesiastical orders at once, that the supreme one might be thus conferred upon him; but happening to be a great bigot to the popish religion, he would not accept of his new dignity but with a proviso, that his ordination should be approved by the pope. This was indirectly submitting the church of Abyssinia to that of Rome; to which David would never have agreed, had it not been for the desperate situation of his affairs at that time. John was therefore allowed to do as he thought proper: when passing through Arabia and Egypt to Italy, he had his ordination confirmed by the pope; after which he set out on the business of his embassy. On his arrival at Lisbon, he was acknowledged by the king as patriarch of Alexandria, Abyssinia, and of the sea; for this last title had also been conferred upon him by his Holiness. Entering then upon the purpose of his embassy, he began by putting Zaga Zaab in irons for having waited so much time, and done nothing effectual since he had left Abyssinia. Then he represented to the king the distresses of the Abyssinians in such a strong light, and insisted so violently for relief to them, that an order was very soon procured for 400 musketeers to be sent by Don Garcia de Noronha to their relief. To accelerate the progress of the intended succours, John himself proposed to sail in the same fleet with Don Garcia; but his voyage was delayed for a whole year by sickness, occasioned, as he supposed, by poison given him by Zaga Zaab, the monk whom he had imprisoned, and who had been set at liberty by the king. After his recovery, however, he set sail for India, where he arrived in safety. The death of Don Garcia, which happened in the mean time, occasioned another delay; but at last it was resolved, that Don Stephen de Gama, who had succeeded to Don Garcia, should undertake an expedition to the Red sea, in order to burn some Turkish galleys which then lay at Suez. But intelligence having in the mean time been received of the intended voyage, these vessels had withdrawn themselves. Anchoring then in the port of Masuah, Don Stephen sent over to

A body of Portuguese ordered to assist the emperor.

Arkeeko on the continent to procure fresh water and other provisions; but the Turks and Moors being now entirely masters of that coast, the goods he had sent in exchange were seized without any thing being given in return. A message was brought back, importing that the king of Adel was now master of all Ethiopia, and consequently that no trade could be carried on without his leave; but if Don Stephen would make peace with him, the goods should be restored, a plentiful supply of water and all kinds of provisions granted, and amends likewise made for 60 Portuguese who had been killed at Zeyla. These had run away from the fleet on its first arrival in the Red sea, and landed on the coast of Adel, where they could procure no water; of which the barbarians took advantage to decoy them up the country; where, having persuaded them to lay down their arms, they murdered them all. To this Don Stephen returned a smooth answer, sent more goods, obtained provisions, and promised to come ashore as soon as a Mahometan festival, which the savages were then celebrating, should be over. This treaty was carried on with equal bad faith on both sides; but Don Stephen had now the advantage by obtaining the provisions he stood in need of. These were no sooner brought on board, than he strictly forbade all intercourse with the land; and choosing out 600 men, he attacked the town of Arkeeko, killed the governor, and sent his head to the Abyssinian court; massacring at the same time all the people in the town he met with.

Abyssinia. The succours arrive and take the town of Arkeeko.

During this long interval, a considerable change had taken place in the Abyssinian affairs. We have already seen that David had been reduced to great distress; but afterwards met with some little successes, which seemed to indicate an approaching change of fortune. In these, however, he was soon disappointed. A Mahometan chief called *Vizir Mugdid* made an attack upon the rock *Gesben*, where the royal family were kept; and finding it entirely unguarded, succeeded without opposition, and put every person to the sword. This last disaster seems to have been too great for the resolution even of this heroic prince, as he died the same year 1540. He was succeeded by his son *Claudius*, who, though then but about 18 years of age, was endowed with all the great qualities necessary for managing the affairs of the empire in such a dreadful crisis, and had made considerable progress before the arrival of the Portuguese.

Affairs of Abyssinia during this interval.

Royal family massacred.

Death of David, and accession of Claudius to the empire.

On his accession, the Moors, despising his youth, instantly formed a league among themselves to crush him at once; but, like almost all others too confident of victory, they neglected to take the proper precautions against a surprise. This was not unobserved by Claudius; who falling upon one party which lay next to him, gave them a total defeat. The king pursued them the whole day of the engagement, the ensuing night, and part of the following day; putting to death without mercy every one who fell into his hands. This excessive ardour very much damped the spirits of his enemies, and at the same time inspired his own party with the most sanguine hopes of success; whence he soon appeared at the head of such an army as convinced his enemies that he was by no means to be despised. They now found it necessary to desist from the practice they had so long continued, of plundering and ravaging

A powerful league formed against the new emperor.

The Moors defeated.

Abyssinia. ravaging the country; to call in their scattered parties, unite their troops, and spend the rainy season in such parts of Abyssinia as they had conquered, without returning into Adel, as had hitherto been usual with them. They now came to a resolution to force the king to a general engagement, in which they hoped to prove victorious by dint of numbers. For this purpose all the rebel chiefs in Abyssinia were called in, and a formidable army collected. They waited only for one very experienced chief named *Jonathan*; after whose junction they determined to attack the royal army without delay. But *Claudius* took his posts at all times with such judgment, that any attempt upon his camp would have been almost desperate; and getting intelligence where *Jonathan* lay with his forces, he marched out in the night time, came upon him quite unprepared, defeated and killed him, sending his head to the rest of the confederacy by a prisoner, the only one he had spared out of all those who were taken. By the same messenger a defiance was sent to the Moors, and many opprobrious epithets were bestowed upon them; but though the armies approached one another, and continued for several days under arms, the Moors were so much intimidated that they would by no means venture an engagement.

Jonathan, a rebel chief, defeated and killed.

Unsuccessful attempt to assassinate *Claudius*.

By this victory the spirits of the Abyssinians were so much elevated, that they flocked in from all parts to join their prince; and even many of the Mahometans, having experienced the lenity of the Christian government, chose rather to submit to *Claudius* than to the Turks and Adeliens. The king, however, was in danger of being assassinated by one *Anmer*, a treacherous governor; who knowing that he had retired to some distance from his army to celebrate the festival of Easter, attempted to surprize him when almost destitute of attendants; but *Claudius* having timely notice of his designs, laid an ambush for him with a considerable part of his army which he headed in person. The rebel, not being equally well informed, fell into the snare, was defeated, and almost his whole army cut off on the 24th of April 1541.

Derivation of the name of a bay in *Mafuah*. The Portuguese under *Don Christopher de Gama* set out to meet the emperor.

Such was the situation of affairs when the Portuguese arrived. The head of the governor of *Arkeeko* had been received by the queen, who regarded it as a happy instance of the valour of her allies, and as a presage of future victories. The Portuguese admiral, *Don Stephen de Gama*, lost no time in employing the men allowed by the king to assist the Abyssinians. These were in number 450; but as the officers who commanded them were all noblemen of the first rank, the army was considerably increased by the number of their servants. The supreme command was given to *Don Christopher de Gama* the admiral's youngest brother. Almost every man on board, however, was ambitious to share in the glory of this enterprise; whence great complaints were made by those who were not allowed to go: and hence, *Mr Bruce* informs us, the bay in the island of *Mafuah*, where the admiral's galley rode, had the name of *Babia dos Agravados*; the bay of the injured, not of the sick, as has been erroneously supposed.

This gallant army instantly set forward by the most easy road through the Abyssinian territories, in order to join the emperor. Still, however, the way was so rugged, that the carriages of their artillery gave way,

and they were therefore obliged to construct new ones as they went along, splitting the barrels of old muskets to furnish them with iron, which was extremely scarce in Abyssinia. In this journey the general was met by the empress, attended by her two sisters and a great many others of both sexes, whom he saluted with drums beating and colours flying, accompanied by a general discharge of the fire-arms, to their great confusion and terror. Her majesty, whose person was entirely covered, indulged the Portuguese general with a view of her face; and after a mutual exchange of civilities, the queen returned with 100 musketeers appointed by him as her guard. After eight days march, through a very rugged country, *Don Christopher* received a defiance in very insulting terms from *Gragné* the Mahometan general, which was returned in the same style. An engagement took place on the 25th of March 1542; in which little was done by either party besides wounding both the commanders: however, *Gragné*, though greatly superior in horse, had already felt so much of the Portuguese valour, that he did not choose to venture a second battle.

Abyssinia.

Interview with the empress.

Battle between the Portuguese and the Moors.

As the season was now far advanced, the Portuguese put themselves into winter-quarters; while *Gragné* remained in their neighbourhood, in hopes of forcing them to a battle before they could be joined by the king, who advanced for the purpose as fast as possible. This being the case, it was to the last degree imprudent in *Don Christopher* to think of venturing an engagement without previously forming a junction with his royal ally; especially as *Gragné* had now doubled the number of his horse, increased his train of artillery, and otherwise received considerable reinforcements. Unfortunately, however, the Portuguese general suffered himself to be hurried away by the impetuosity of his own temper; and paying regard to the defiances and reproaches of a barbarian whom he ought to have despised, was induced, contrary to all advice that could be given, to venture an engagement at a vast disadvantage. Yet when the armies encountered each other, the superiority of the Portuguese was so great, that victory seemed likely to be decided in their favour. On this *Gragné* ordered some artillery to be pointed against the Abyssinian allies. These, entirely unaccustomed to fire-arms, fled almost at the first discharge. *Gragné*, well knowing that it was his interest to destroy the Portuguese, who were only 400 in number, ordered no pursuit against the Abyssinians, but fell with his whole force upon the Europeans. Even yet his success was doubtful, till *Don Christopher*, exposing himself too much, was singled out and shot through the arm. This produced such confusion, that a total defeat, with the loss of the camp, ensued; when the barbarians, according to custom, put to death all the wounded, and began to abuse the women, who had all retired into the tent of the general. This being observed by a noble Abyssinian lady married to one of the Portuguese, she set fire to some barrels of gunpowder which happened to be in the tent, and thus perished along with her ravishers.

Don Christopher, who by his rashness had occasioned this disaster, obstinately refused to fly, till he was put into a litter by force, and sent off along with the queen and patriarch, who happened to be present. The two latter had set off before the battle; but *Don Christopher*

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Abyssinia. pher sent some horsemen in pursuit of them, by whom they were brought back, and reproached by the general for the bad example they had shown to the army. Arriving at the approach of night in a wood where there was a cave, Don Christopher entered it to have his wound dressed, but obstinately refused to proceed farther. Next day he was taken; betrayed, as is most probable, by a woman whom he loved; who is said to have pointed out this cave to him, and promised to send some friends to convey him into a place of safety. Instead of this, a party of the enemy entered the cave; and on his readily informing them of his name, they instantly carried him in triumph to Gragné. Here, after several insults had passed on both sides, the barbarian, in a fit of passion, cut off his head; which was sent to Constantinople, and his body cut in pieces and dispersed through Abyssinia.

This cruelty of Gragné proved more detrimental to his cause than a complete victory gained by the other party could have been. On the one hand, the Portuguese were so exasperated by the loss of their leader, that they were ready to embark in the most desperate undertakings, in order to revenge his death; on the other, the Turks, on whom he principally depended, were irritated to the last degree at the disappointment of sharing his ransom, which they imagined would have been an immense sum; and therefore abandoned their leader to return to their own country. Gragné, thus left to decide the quarrel with his Africans, was quickly defeated by Claudius; and in another engagement which took place on the 10th of February 1543, his troops were defeated and himself killed. This last misfortune was owing to his boldness in advancing before his army which was giving way, so that he became known to the Portuguese. On this he was singled out by a Portuguese named *Peter Lyon*, who had been valet de chambre to Don Christopher. This man, to make his aim more sure, crept for a considerable way along the bank of a river towards the place where Gragné was; and when come sufficiently near, shot him quite through the body. Finding himself mortally wounded, he quitted the field of battle; and was followed by Lyon, who in a short time saw him fall from his horse. He then came up to him, and cut off one of his ears, which he put in his pocket, and returned to the battle to do what further service he could. The next day Gragné's body was found by an Abyssinian officer, who cut off his head and claimed the merit of killing him; but Lyon having pulled out the ear which he carried in his pocket, vindicated his own right to the reward which was to be given to the other. On this occasion the Moorish army was almost entirely destroyed; Gragné's wife and son were taken prisoners, with Nur the son of Mugdid, who destroyed the royal family; and it had been happy for Claudius, as we shall afterwards see, that he had put these prisoners to death. Very soon after this engagement, the emperor had intelligence that Joram, a rebel chief who had once reduced his father David to great distress, was advancing rapidly in hopes of being still able to be present at the battle. This was the last of his father's enemies on whom Claudius had to revenge himself; and this was effectually done by a detachment of his army, who posted themselves in his way, fell up-

Takes shelter in a cave, is taken, and put to death.

Gragné, abandoned by his allies, is defeated and killed.

Joram a rebel chief defeated and killed.

on him unexpectedly, and cut him in pieces with all his men.

Claudius being now freed from all apprehension of foreign enemies, began to turn his thoughts towards the reparation of the damages occasioned by such a long war, and the settlement of religious affairs. We have already mentioned, that John Bermudes was appointed by the Pope, as he said, patriarch of Alexandria, Abyssinia, and of the sea. This however, is said by others to have been a falsehood; that John was originally ordained by the old patriarch of Abyssinia; and that the Pope did no more than give his sanction to this ordination, without adding any new one of his own. But whether this was so or not, certain it is, that John, who was very insolent in his behaviour, and of a turbulent disposition, now began to insist that Claudius should not only embrace the doctrines of the church of Rome, but establish that religion throughout the empire, which he said his father David had engaged to do; and which, considering the extreme distress in which he was involved, it is very probable that he did. Claudius, however, was of a different opinion, and refused to alter the religion of the country; upon which a contention began, which was not ended but by the total expulsion of the Catholics, and the cutting off all communication with Europeans. At that time the Portuguese and Abyssinians intermarried, and attended religious worship promiscuously in each others churches: so that the two nations might have continued to live in harmony, had it not been for the misbehaviour of Bermudes. Claudius, perceiving the violence and overbearing disposition of the man, took every opportunity of showing his attachment to the Alexandrian or Greek church; denying that he had made any promise of submitting to the see of Rome. On this Bermudes told him that he was accursed and excommunicated; the king in return called him a Nestorian heretic; to which Bermudes replied by calling him a liar, and threatened to return to India, and carry all the Portuguese along with him. To this insolent speech Claudius answered, that he wished indeed that Bermudes would return to India; but that he would not allow the Portuguese, nor any person, to leave his territories without permission.

Thus matters seemed likely to come to an open rupture; and there can be no doubt that the worst extremities would have followed, had not the emperor been restrained by the fear of the Portuguese valour on the one hand if he should attempt any thing against them, and the hopes of further advantages should he retain them in his service. For these reasons he bore with patience the insults of the patriarch; attempting to gain the rest of the Portuguese over to his side. He succeeded perfectly with their commander Arius Dias, who privately renounced the church of Rome, and was baptized into that of Abyssinia by the name of *Marcus* or *Marco*; in consequence of which, the emperor, looking upon him as a naturalized subject, sent him a standard with the Abyssinian arms to be used instead of those of Portugal. This, however, was not delivered; for a Portuguese named *James Brito*, meeting the page who carried it, took it from him and killed him with his sword. The apostasy of Arius is said to have been owing to the great honours which had been conferred

Abyssinia.

Disturbances on affairs of religion.

Altercation betwixt the emperor and the patriarch Bermudes.

The Portuguese commander renounces the Romish religion.

Abyſſinia. upon him by the Abyſſinian monarch : for having, in an expedition againſt Adel, defeated and killed the king, and taken the queen priſoner, he beſtowed her in marriage on Arius; and that the match might be equal, he raiſed him alſo to the royal dignity, by giving him the kingdoms of Doar and Belwa.

He is in-
veſted with
royal dig-
nity.

Hoſtilities
between
the Abyſ-
ſinians and
Portugueſe.

The alteration on the ſubject of religion becoming every day more violent, Bermudes was prohibited by the emperor from ſending any farther orders to the Portugueſe, they being now under the command of Marco the Abyſſinian captain-general; meaning Arius Dias, to whom the name of Marco had been lately given. To this the patriarch replied, that being ſubjects of the king of Portugal, they were under no obligation to obey a traitor to his king and religion; and that ſince his majeſty ſtill perſiſted in reſuſing to ſubmit to the pope, he was reſolved to leave the empire with his forces. The emperor, however, ſtill inſiſted that he was abſolute in his own dominions; and he expected the Portugueſe to pay obedience to his general, and none eſſe. The Portugueſe, enraged at this declaration, reſolved to die ſword in hand rather than ſubmit to ſuch terms; and therefore began to fortify their camp in caſe of any attack. The emperor, on this, thinking a defiance was given him in his own territories, ordered the camp to be inſtantly attacked. The attempt was accordingly made, but with very little ſucceſs; the Portugueſe having ſtrewed the ground with gunpowder, ſet fire to it as the Abyſſinians marched along, which deſtroyed great numbers, and intimidated the reſt to ſuch a degree that they inſtantly fled. Finding it in vain to think of reducing them by force, the emperor is then ſaid to have been adviſed by Marco to conſult his own ſafety, and break the power of the Portugueſe by artifice. With this view he ſent for the patriarch, pretended to be very ſorry for his frequent breach of promiſe, and deſirous to make what amends for it he could. Inſtead of complying with the patriarch's demands, however, he firſt ordered his ſubjects to ſupply them with no proviſions: then he ſtopped the mouths of the Portugueſe by a conſiderable quantity of gold, giving the patriarch himſelf a very valuable preſent; adding to all this a large ſupply of proviſions; but at the ſame time taking proper methods to diſperſe their leaders into different parts of the empire, ſo that they ſhould find it impoſſible ever to reunite in a body.

Such is the account given of this tranſaction by the Portugueſe hiſtorians; but that of Mr Bruce, who ſays that he tranſlated his from the Abyſſinian annals, is ſomewhat different. He only informs us, that the quarrel betwixt the Portugueſe and Abyſſinians was inflamed by the " incendiary ſpirit of the brutiſh Bermudes: from reproaches they came to blows; and this proceeded ſo far, that one night the Portugueſe aſſaulted the king's tent, where they ſlew ſome and grievouſly wounded others." The event, however, was that no abſolute quarrel ever took place betwixt this emperor and any of the Portugueſe, excepting this patriarch, whom he was on the point of baniſhing to one of the rocks uſed as priſons in Abyſſinia. This was diſpenſed with on the interpoſition of Gaſpar de Suza the new Portugueſe commander (who had ſucceeded Arius Dias), and another named *Kaſmati Robel*, both of whom were in great favour with the emperor; and Bermudes per-

ſuaded to withdraw to India. According to Mr Bruce he repaired to Dobarwa, where he remained two years quite neglected and ſerlom, ſaying maſs to no more than ten Portugueſe who had ſettled there after the defeat of Don Chriſtopher. He then went to Maſuah; and the wind ſoon becoming favourable, he embarked in a Portugueſe veſſel, carrying with him the ten perſons to whom he had officiated as prieſt. From Goa he returned to Portugal, and continued there till his death. On the other hand, the Portugueſe writers inform us, that he was narrowly watched by orders of the emperor; and that Gaſpar de Suza, the Portugueſe commander, had orders to put him to death if he ſhould attempt to make his eſcape. Bermudes, however, being determined at all events to make his eſcape, pretended to be ill of the gout, and that a change of air was neceſſary for his recovery; for which reaſon he went to the town above mentioned, where there was a moſtery. On this pretence he was allowed to croſs the kingdom of Tigré, accompanied by eight faithful ſervants, with whom he reached Dobarwa unſuſpected. Here he remained concealed in a moſtery for two years before he could find an opportunity of getting to the iſland of Maſuah, from whence he proceeded to Goa.

Abyſſinia.
Bermudes
leaves A-
byſſinia.

The emperor was ſcarce freed from this troubleſome A new de-
putation
from the
Pope. prieſt, when he was in danger of being involved in new difficulties by the intrusion of others into his dominions. Ignatius Loyola, founder of the order of the Jeſuits, was at that time at Rome; and ſo much attached to the cauſe of the pope, that he propoſed to go in perſon to Abyſſinia, in order to make a thorough converſion of both prince and people. His holineſs, however, who, from what he had already ſeen of Ignatius, conceived that he might be of greater uſe to him by ſtaying in Europe, ſent in his ſtead Nugnez Baretto, one of the ſociety of Jeſuits, whom he inveſted with the dignity of patriarch, and honoured with a letter to Claudius. With theſe commiſſions, and a number of prieſts, Baretto ſailed for Goa in the Eaſt Indies; by which, however diſtant, the only paſſage to Abyſſinia was at that time. On his arrival at that place he was informed that the Abyſſinian monarch had ſuch a ſteady averſion to the church of Rome, that there was no probability of his meeting with a favourable reception. For this reaſon it was judged more proper to ſend ſome clergymen of inferior dignity, with proper credentials, as ambafſadors to the emperor from the governor of India, without running the riſk of having any affront put upon the patriarch. Theſe were Oviedo biſhop of Hierapolis, Carneyo biſhop of Nice, and ſeveral others, who arrived ſafely at Maſuah in the year 1558. Claudius, on hearing of their arrival, was greatly pleaſed, as ſuppoſing that a new ſupply of Portugueſe ſoldiers were arrived. Finding, however, that they were only prieſts, he was very much mortified, but ſtill reſolved to give them a civil reception. But a more important conſideration, and which concerned the welfare of the empire in the hiſheſt degree, now claimed his attention. This was the appointment of a ſucceſſor to the throne, Claudius himſelf having no ſon. A project Prince Me-
nas re-
deemed
from capti-
vity. was therefore ſet on foot for ranſoming Prince Menas, the emperor's youngeſt brother, who had been taken priſoner by the Moors in the time of David, and hi-
thero detained in captivity on a high mountain in Adel.

This

Abyſſinia. This was not likely to be accompliſhed; for the Moors would not willingly part with one who they knew was their mortal enemy, that he might be raiſed to the ſovereignty of a great empire. By detaining him priſoner alſo, they might reaſonably hope for diſputes concerning the ſucceſſion to the Abyſſinian throne; which would enable them to attack the empire with advantage. In theſe circumſtances, it is probable that Claudius would have found great difficulty in procuring his brother's liberty, had it not been that the ſon of the famous Gragné had been taken in that battle in which his father was killed, and in like manner confined on a mountain in Abyſſinia. A propoſal was then made to his mother, who had eſcaped into Atbara, that her ſon ſhould have his liberty, provided the king's brother ſhould be reſtored. This was accepted; and by means of the baſhaw of Maſuah, an exchange was made. Four thouſand ounces of gold were given for the ranſom of Menas, which were divided between the Moors and the baſhaw of Maſuah; while on his part Claudius ſet at liberty Ali Gerad the ſon of Gragné without any further demand.

According to Bermudes's account of theſe times, the widow of Gragné was taken priſoner at the battle in which her huſband was killed, and was afterwards married to Arius Dias. In this caſe we muſt ſuppoſe her to have been the ſame with the *queen of Adel*, mentioned as his conſort by other hiſtorians: but Mr Bruce treats this account as a mere fable; and informs us, that by means of Nur the ſon of Mugdid, murderer of the royal family as already related, he made her eſcape into Atbara. On that occaſion Nur fell in love with her; but he reſuſed to marry any man unleſs he brought her the head of Claudius, who had killed her former huſband. To attain his wiſhes, therefore, Nur, now governor of Zeyla, undertook the taſk; and when Claudius marched towards Adel, ſent him a challenge to fight; telling him that there was yet a particular inſtrument for ſhedding the blood of the Abyſſinian princes, and deſiring him to be prepared, as he was very ſoon to ſet out to attack him. The emperor did not decline the combat, but is ſaid to have been adviſed againſt this expedition by all his friends. This advice ſeems to have proceeded from a number of prophecies, probably trumped up by the clergy, that he ſhould be unfortunate, and loſe his life in the campaign. Theſe prophecies ought no doubt to have had weight with him, as they moſt certainly indicated a ſpirit of diſaffection among his troops; and the event accordingly evinced that it was ſo. The Abyſſinians fled almoſt

Nur deter- mines to deſtroy Claudius.

on the ſite fire, leaving the king in the midſt of his enemies, attended only by 18 Portuqueſe and 20 horſemen of Abyſſinia, who continued faithful to the laſt. All theſe were killed after the moſt deſperate reſiſtance; the king himſelf receiving upwards of 20 wounds before he fell. His head was cut off, and brought by Nur to his miſtreſs, who hung it up on a tree before her door. Here it remained for three years, when it was at laſt bought by an Armenian merchant, who buried it at Antioch in the ſepulchre of a ſaint of the ſame name. Nur gained on this occaſion a very complete victory; the king and moſt of the principal nobility being killed, a great number made priſoners, and the camp taken with an imenſe booty. On his return to Adel, he reſuſed to accept of any

congratulations, or to allow rejoicings to be made for his victory, but paſſed along in the habit of a common ſoldier mounted on an aſs; ſaying, that he owed the victory to the mercy of God alone, who had immediately interpoſed for the deſtruction of the Chriſtian army.

This fatal engagement took place on the 22d of March 1559; and as the ſucceſſion had been already ſettled, Menas aſcended the throne without any oppoſition. On his acceſſion he found his affairs in great confuſion, and he had ſtill to contend with foreign and domeſtic enemies. The firſt of theſe was Radaet the king of the Jews, who had a territory in the empire of Abyſſinia, the capital of which was on a rock named *Samen*. The cauſe of this quarrel is not known, but the event was unfortunate; the king being obliged to abandon the enterpriſe, after having beſtoved a conſiderable time upon it. This was followed by an attempt to aſſaſſinate him, which had very near taken place; and this again by a conſpiracy among his principal nobles headed by Iſaac the Baharnagaſh. He had been a very faithful ſervant of the late emperor Claudius; but ill uſed by Menas, who was of a very haughty and moroſe diſpoſition. In attempting to ſuppreſs this rebellion, the firſt attempts of the emperor were likewiſe ineffectual, his forces being attacked by ſurpriſe and entirely defeated. Soon after this, Iſaac proclaimed Taſcar the nephew of Menas, who was then at liberty, king of Abyſſinia; hoping thereby to ſtrengthen his cauſe, and enable him to cope with the emperor, who was aſſembling a powerful army againſt him. This expedient did not answer the purpoſe. His army was entirely defeated by Menas; Taſcar taken priſoner, and thrown headlong from the top of a precipice; and Iſaac himſelf eſcaped with great difficulty to the confines of his own government in the neighbourhood

Abyſſinia.

Rebellion of Iſaac the Baharnagaſh.

He is defeated.

of Maſuah. Here he entered into an alliance with the Turkiſh baſhaw of Maſuah; whoſe friendſhip he gained by putting him in poſſeſſion of the town of Doabarwa, and the flat country adjacent, which abounds with the provisions wanted at Maſuah, and is looked upon as the key to the province of Tigré and the high-lands of Abyſſinia. Beſides this, Iſaac ſtrengthened himſelf alſo by an alliance with the Portuqueſe; which, had their numbers been at all conſiderable, muſt have been very formidable. Their inclination to deſert their former protector and ally the emperor, proceeded entirely from the ſhameful behaviour of their prieſts, who never would be ſatisfied without enſlaving the emperor as well as his ſubjects to the tyranny of Rome. We have already ſeen that Bermudes had proceeded ſo far on this ſubject, that he narrowly eſcaped with his life. His ſucceſſor Oviedo (for the patriarch Nuguez died by the way) ſared ſtill worſe. On his introduction to the emperor Claudius, he informed him, that the pope and king of Portugal now expected no leſs than an immediate fulfilment of his engagements of ſubmiſſion to the ſee of Rome. This requiſition was made with ſuch an air of inſolence, that the prince could ſcarce conceal his reſentment; but reſtraining his paſſion, he promiſed to conſider of it, and to call meetings of the learned in theſe matters to debate the point. This was a very fruitleſs taſk; and therefore Oviedo thought proper to quit the court towards the end of December 1558; leaving behind him an inſolent letter addreſſed to the

Reason of their quarrel with the emperor.

Portuqueſe

Abyssinia. Portuguese and such converts as they had made; in which he exhorted them not to converse with schismatics, and the Abyssinians to forsake their errors. Being now debarred from access to the emperor, he began to entertain the people with seditious discourses; which practice he continued during the remaining part of the reign of Claudius and the beginning of that of Menas. The latter, perceiving the pernicious tendency of his discourses, positively commanded him to desist; which the patriarch refusing, the emperor fell upon him with his own hands, beat him severely, tore his clothes and beard, and took his chalice from him that he might thus be disabled from saying mass: after which he banished him, with Francis Lopez another of his associates, to a barren mountain, where they remained seven months in great misery. Not content with this, he issued many severe edicts against the Portuguese; prohibited them from intermarrying with the Abyssinians; and such of the Abyssinian women as were already married to Portuguese husbands, he commanded not to accompany them to their churches. His next step was to call Oviedo again into his presence, and command him, under pain of death, instantly to leave his dominions. The insolent and foolish priest refused obedience to this express command: he declared that he would obey God rather than man; and presenting his bare neck to the emperor, desired him to strike and put an end to his life at once. Menas drew his sword, but was prevented by the queen and officers who stood near him from giving the fatal stroke. A second beating and banishment to the mountain succeeded; and in the latter part of the sentence all the Portuguese priests as well as others were included. The Portuguese, however, determined not to submit to such an indignity; and therefore, to a man, joined Isaac; who, in expectation of more auxiliaries from India, professed a great desire of embracing the Romish religion. The king was very apprehensive, and not without reason, of the arrival of more Portuguese; but it appears that Oviedo had not sufficient interest to procure the supply he promised. An engagement, therefore, took place without them, in which Menas was again victorious; though the battle was not so decisive as to put an end to the rebellion.

The emperor died a short time after his victory, and was succeeded in 1563 by his son Sertza Denghel, then only 12 years of age. The beginning of his reign was disturbed by new rebellions; which, however, were happily suppressed. Isaac, with his allies the bashaw and the Portuguese, seem to have remained for some time unmolested; and in the year 1569, a kind of accommodation took place. It is by no means easy to say how the Portuguese were again received into favour after such flagrant treachery and rebellion. Mr Bruce only simply tells us that "Oviedo and the Portuguese did not appear at court." This indeed is not to be wondered at, as they had been so lately at open war with the emperor. Other accounts say, that after the last battle with Isaac, "their name became so odious to all the Abyssinians, especially to their monarchs, that they would never suffer any of them to be in their army from that time." Some of these accounts say also, that Menas was defeated and killed in another battle; others, that he was driven to some high mountains, where he wandered about till death put an end

to his misery. Accounts of this kind, however, are by Mr Bruce treated as mere falsehoods, and expressly contradictory to the annals of those times. All we can say upon the subject therefore is, that after the defeat of Isaac, the Portuguese, not excepting Oviedo himself, remained in Abyssinia, where they were more favourably dealt with by the new emperor than they had been by his father; though he was no friend to their religion, as supposing it to be destructive of monarchy and all civil government. It is probable also, that the various disturbances which happened, together with his own tender age during the beginning of his reign, would prevent him from paying that attention to them which he would otherwise have done. The Galla, a very barbarous nation, and who have at last greatly reduced the power of the Ethiopian monarchs, made frequent inroads during this reign; and in the year 1576, a league was formed by Mahomet king of Adel, with Isaac and the Turkish bashaw, who had either continued their hostilities or renewed them about this time. The emperor, however, marched with such expedition, that he did not allow them time to join their forces; and attacking them separately, gained a complete victory over them all. Almost the whole Moorish army was destroyed; but while the emperor entered Adel with a design to make a full end of his enemies on the east, he received information that the Galla had invaded his dominions on the west. Traversing the whole breadth of the empire therefore with the utmost expedition, he came up with these enemies, who were afraid to encounter him. On this he turned his arms against the Falasha, obliging them to deliver up their king, whom he banished to a mountain. Then invading the country of the Galla and Falasha, he ravaged it for four years successively, protecting at the same time the kingdom of Narea from the inroads of these barbarians.

While Sertza Denghel employed himself in repressing the incursions of the Galla, one Cadward Basba, a Turkish officer of great valour and experience, who had been invested with the office of bashaw of Masuah, began to make inroads into the province of Tigré. The emperor hastened to oppose him; but in his passage committed great devastations in the country of the Falasha, in order to provoke them to descend from their mountains and come to an engagement. These Falasha profess the Jewish religion, and were then governed by a king named *Geshen*. This monarch, provoked at the ravages and destruction he beheld, descended with vast numbers of his subjects, in order to revenge it; but was killed, and his army utterly defeated by the Abyssinians, on the 19th of January 1594. The victorious Sertza then hastened to encounter the bashaw; who, confident of the superiority of his own troops, not only waited for him patiently, but gave him every advantage he could desire. A very desperate battle ensued; the event of which was doubtful, till Robel, commander of part of the king's household troops, who were armed with pikes, attacked that part of the Turkish horse where he saw the bashaw, and killed the officer who carried the standard. In doing this he broke his pike; but though then destitute of any other weapon than a short crooked knife which the Abyssinians always carry in their girdles, he instantly pushed up to the bashaw, and with it wounded him mortally

Oviedo banished to a mountain.

Is commanded to leave the empire, but refuses.

Sentence of banishment passed on all the Portuguese, who thereupon join the rebels.

Isaac again defeated.

Reign of Sertza Denghel.

Abyssinia.

Isaac and the bashaw league with the king of Adel;

but are entirely defeated.

The emperor invades and ravages the country of the Galla and Falasha.

Tigré invaded by Cadward Basba.

King of the Falasha defeated and killed.

The bashaw defeated and killed.

Abyssinia. tally in the throat. This unexpected event instantly decided the victory; the Turkish horse betook themselves to flight, and the rest of the army soon followed their example. A dreadful slaughter ensued among the Moors, who were pursued to the island of Masuah; and many were driven into the deserts, where they perished with thirst. After this, marching back to the western part of his territories, the emperor proceeded to Narea, destroying the Galla as he went along. His last expedition was towards Damot to chastise some rebels there. Before he set out, a priest of great sanctity and talent for divination, is said to have warned him not to undertake the war; but his advice was rejected with contempt: on which he requested him only not to eat the fish taken out of a certain river; but this advice was also neglected, and the fish being really of a poisonous nature, the king died in consequence of eating them.

Death of the emperor.

Two successors nominated.

Jacob raised to the throne.

On the death of Sertza Denghel a dispute ensued about the succession. In the beginning of his sickness the late king had named for his successor his son Jacob, a boy of only seven years of age; but finding death approaching, he named his nephew Za Denghel, as being come to the years of manhood, and more fit for the government of such a numerous and turbulent people. This last resolution proved highly disagreeable to the queen and some of the principal nobility, who wished for a minority, during which they might engross the power into their own hands. In conjunction with her two sons-in-law, Kella Wahad and Ras Athanasius, therefore, the empress determined to raise Jacob to the throne, notwithstanding the final determination of the late king above mentioned. This was put in execution immediately after the death of Sertza Denghel; Jacob was raised to the throne, and Za Denghel confined in an island of the lake Dembea or Tzana. An attempt was likewise made to seize Socinios, natural son to Facilidas grandson of the unfortunate David, who had likewise a claim to the throne; for his not being born of a lawful marriage was no objection in Abyssinia. Socinios, however, no sooner saw the fate of his cousin Za Denghel, than he withdrew himself from the power of his enemies; and Za Denghel himself, after being a short time confined in the island above mentioned, found means to escape, and took refuge among the inaccessible mountains of Gojam.

Thus disappointed in their attempts on the princes, the empress, with her two sons-in-law, were obliged to pretend loyalty to Jacob, whom they governed till he was 17 years of age. The young king then perceiving that his tutors were taking some steps to prolong their dominion over him, took the government into his own hands, and banished one Za Selasse, whom they had employed in the execution of their projects, to the kingdom of Narea. The conspirators, alarmed at this bold exertion of royal prerogative, determined instantly to depose Jacob, and raise Za Denghel, whom they had banished, to the throne. This, however, was now a matter of some difficulty, as he had concealed himself so effectually among the mountains of Gojam, that he could scarce be found out. His retreat being at last discovered, Ras Athanasius took an opportunity of insulting Jacob, even while sitting on the throne; called him an obstinate, stubborn, and foolish boy; declared him degraded from the imperial dignity, and

Za Denghel raised to the throne.

that Za Denghel was coming to supplant him. Jacob, perceiving by the insolence of this speech, that he was entirely in the power of his enemies, left his palace in the night, in order to fly to the mountains of Samen, where his mother's relations were, from whom he expected protection. He got to the borders of that country, but was there discovered, seized, and brought back to his rival, who was now seated on the throne. Za Denghel, however, with a clemency not very usual in Abyssinia, did not either put him to death, or mutilate him in such a manner as to render him incapable of afterwards enjoying the kingdom; but contented himself with banishing him for life to Narea.

Jacob banished.

Za Denghel was no sooner settled on the throne, than he unluckily behaved in such a manner as to alienate the affections of his people from him entirely. This was occasioned by his attachment to the church of Rome. Ever since the time that the Portuguese had joined Isaac the Baharnagash, the entrance into Abyssinia had been shut up by the Turks, so that no new missionaries could have access; and all those who came with Oviedo being dead, the Romish religion had languished for want of preachers to support it. The last of these died in 1596; and all the rest having been dead some time before, little could be expected from the labours of a single person. Next year Melchior Sylvanus, a vicar of the church at Goa, was sent on a mission to Abyssinia; being supposed to be a proper person for this work, on account of his language and complexion, which might baffle the vigilance of the Turks. He entered without being suspected; but the great defeat given the Turks by Sertza Denghel, already mentioned, had reduced their power so much, that less danger now attended this expedition than formerly, and other missionaries quickly followed.

Decline of the Romish religion in Abyssinia.

The most learned, as well as the best qualified for the undertaking in every respect, was Peter Paez, who came to this country in the year 1600; and on his taking upon him the whole charge of the mission, Sylvanus returned to India. The new missionary did not at first affect to intrude himself on the emperor; but taking up his residence at the convent of Fremona in the province of Tigré, he first applied to the study of the learned language of the Abyssinians called *Geez*, and in which their books are usually written. In this he made such progress as quickly to surpass the natives themselves; after which he set up a school, where the children of the Portuguese and Abyssinians were taught promiscuously. The progress made by his scholars was so great, that he was spoken of at court, and recommended in the warmest terms to the emperor Jacob before his deposition. On this he was sent for, and appeared before the court in 1604; where, to the great dissatisfaction of the Abyssinian monks, he received such honours as are usually bestowed on men of the first quality. Next day, in a dispute before the king, two of his scholars, whom he had brought along with him, fairly vanquished the best theologians that could be found to oppose them. Mass was then said in the Romish manner; and this was followed by a sermon, which in the purity and elegance of its diction (whatever the substance might be) excelled any thing that had ever been composed in the Abyssinian language.

Peter Paez restores it.

He arrives at court.

Though Paez had been called to court by Jacob, yet Za Denghel was on the throne before he arrived, and

Abyfinnia. it was he who witnessed the dispute and heard the sermon. He was so much charmed with the latter, that he instantly resolved to embrace the religion of the church of Rome; which resolution he soon after communicated to several of his friends, and even to Paez himself; but under an oath of secrecy. The emperor's own zeal, however, rendered this oath of no use; for in a little time he issued proclamations forbidding the observation of the Jewish Sabbath, and wrote letters to Pope Clement VIII. and Philip III. of Spain, desiring a supply of mechanics to instruct his people in the useful arts, and Jesuits to teach them religion.

His imprudent conduct occasions a rebellion. This precipitate conduct had the effect which might have been expected. The Abyfinnians were generally disaffected to the church of Rome, and no pains had been taken to gain them over: they were also turbulent, savage, and rebellious; ever ready to revolt; and now had a favourable opportunity of excusing their treasons under pretence of zeal for religion. This opportunity was quickly made use of by Za Selasse, whom, as we have already mentioned, Jacob had banished; but who, on the advancement of Za Denghel, had probably been set at liberty. This traitor having first held many seditious meetings in private, prevailed on the Abuna, or Abyfinnian patriarch, to excommunicate the king, and absolve his subjects from their allegiance.

The emperor excommunicated. He then set out for the territory of Gojam, where the people had always been remarkable for their aversion to the church of Rome. In this place, therefore, he found no difficulty in raising an army to fight against his sovereign. Za Denghel, who was an expert warrior, did not fail to go in quest of him with what forces he could raise; but soon found, by the great desertion among his troops as he passed along, how much the excommunication pronounced by the Abuna had availed. This was so alarming, that John Gabriel, an experienced Portuguese officer, advised him to decline an engagement for the present, and take shelter in some fortrefs until his subjects should return to a sense of their duty. This salutary advice was rejected, from the absurd notion that it was a dishonour not to fight a rebel who had defied his sovereign. In the beginning of the engagement, victory seemed to favour the royal cause. The Portuguese carried every thing before them, and routed that wing of the enemy which opposed them. In the other wing, however, the cowardly and treacherous Abyfinnians deserted their king, who was quickly surrounded by his enemies, and left in a desperate situation. A body of nobility, with his own officers and domestics, attended him and fought desperately in his defence. Za Denghel himself, being an excellent horseman, and admirably skilled in the use of arms, performed astonishing feats of valour. At last he was thrown to the ground, grievously wounded in the breast by a lance. Notwithstanding this, he instantly recovered himself, drew his sword, and resisted his assailants so violently, that they were fain to keep at a distance and annoy him with missile weapons. In this situation he stood till almost fainting with fatigue and loss of blood; when the traitor Za Selasse, pushing up his horse violently against him, threw him to the ground by a blow on the forehead, and a multitude then rushing upon him he was dispatched with many wounds.

He is abandoned by his troops and killed. The news of Za Denghel's death were received with such general indignation throughout the Abyfinnian empire, that the rebels durst not name any successor. As it seemed natural to think, however, that Jacob would now be re-elected, messengers were dispatched to acquaint him of his good fortune; but during this interval Socinius appeared, not as a candidate, but as already in possession of the empire, and ready to support his rights by force of arms. His first step was to let Ras Athanasius know his pretensions to the throne, and desire his assistance with his army, promising to reward him as soon as it should be in his power. Without waiting for any answer, he advanced so rapidly, that Athanasius had scarce time to consider what he should reply, when a second message was sent, importing that Socinius was in the neighbourhood, and ordering preparations to be made for receiving him as his sovereign. This expeditious mode of action so much confounded Athanasius, that he complied with the requisitions, saluting him king, and joining his troops to his. Thus successful in his first attempt, Socinius made a similar one on Za Selasse. In this, however, he was disappointed. Za Selasse having first sent an equivocal answer, marched against him with his whole army; while Socinius, happening to fall sick, and putting little confidence in Athanasius, withdrew to the mountains of Amhara. Athanasius likewise, not knowing to whom he should attach himself, withdrew his forces, and stood neuter.

Abyfinnia. His death universally lamented. The empire claimed by Socinius. Za Selasse had refused to join Socinius, in expectation that Jacob would make his appearance, whom he rather wished to enjoy the crown than Socinius; as under the former he might hope to engross all the power to himself. For a long time, however, no answer was returned to his messages; his troops became impatient; so that fearing lest a mutiny or general desertion should take place, he dispatched a messenger to Socinius, acknowledging him for emperor. But scarce was this done, when a messenger arrived from Jacob, informing him that he was then in Dembea, and promising Za Selasse great honours if he would acknowledge him for his sovereign. With these terms the traitor instantly complied, and his example was followed by Athanasius; while Socinius, not as yet able to resist all his enemies, retired again to Amhara. This, however, he was not long of accomplishing. Jacob was by no means possessed of equal military skill; and though Za Selasse was an experienced officer, yet his extreme perfidy, pride, and obstinacy, rendered it very dangerous to have any concern with him. This appeared remarkably in the present case. His pride in the first place would not allow him to join his forces to those of Jacob, lest the latter, who was inferior in military skill, should have a share in the victory he was to gain. Then, intoxicated with his opinion of himself, he neglected to behave with the caution necessary in the neighbourhood of such an experienced general as Socinius, which gave the latter an opportunity of cutting off almost his whole army. Being now obliged to fly with a few attendants to Jacob's camp, he met with an indifferent reception on account of his defeat; for which reason he made proposals to join Socinius. The latter accepted his offer, though he could put no confidence in one who had been guilty of such complicated treachery; only he thought it would be an advantage.

He is obliged to retire.

Jacob set up in opposition to him.

Bad conduct and defeat of Za Selasse Jacob's general.

Abyssinia.
Jacob de-
feated and
killed.

advantage to put it out of his power to join his antagonist. Jacob, on the other hand, confident in his numbers, which are said to have been almost 30 to 1, advanced boldly to give his antagonist battle. Socinius declined the engagement till he had drawn him into a situation where his forces could not act with advantage. A dreadful carnage ensued, Jacob himself perished among the multitude, and his body was never afterwards found. In this battle also was killed the wicked priest Abuna Petros, who was the occasion of Za Denghel's death, as we have already related. Ras Athanasius escaped by the swiftness of his horse, and took refuge in a neighbouring monastery. He was afterwards pardoned at the intercession of Peter Paez; but his goods and estate being confiscated on various occasions, he fell into universal contempt, was abandoned by his wife, and died at last of want. According to the Abyssinian accounts, Socinius ordered the pursuit to be stopped as soon as he saw the head of Abuna Petros; but the Portuguese writers inform us, that he kept it up with the utmost vigour throughout the whole day and part of the night. They particularly mention, that a number of Portuguese, who had joined the army of Jacob, lost their lives on this occasion, by falling over a precipice which they could not avoid in the dark. One of these named *Manual Gonçalves* had the good fortune to light on a tree, where he sat till morning in great terror, but at last was relieved and made his escape.

By this victory Socinius was fully established on the throne, though his situation might still be accounted precarious by reason of the rebellious disposition of many of the provinces. He began with making a general proclamation of pardon, excepting only the murderers of Za Denghel, with whom he had been in terms of intimate friendship. Being informed therefore, that one *Mabardin*, a Moor, had given him the first wound in that battle in which he was killed, he ordered his head to be instantly struck off with an axe before the gate of the palace.

Socinius fa-
vours the
Portuguese.

The Portuguese were much favoured by this prince; and they were become very numerous by continual intermarriages with the Abyssinians; the male children were always trained to the use of fire arms by their parents, and incorporated as soldiers with them; and they were now all united in one body under an experienced officer named *John Gabriel*, whom we have already had occasion to mention. As their numbers and valour made them objects of consideration, Socinius determined to attach them to himself as much as possible; and the best means to do this he knew was by favouring their priests. Peter Paez was therefore sent for to court; where a dispute concerning the supremacy of the pope and the two natures of Christ (the great subjects of debate in Abyssinia), took place, and a sermon was preached with as great success as that in Za Denghel's time. The king first enlarged the territory possessed by the Jesuits at Fremona; after which he declared to Paez his resolution of embracing the Catholic religion; giving him at the same time two letters, one to the king of Portugal, the other to the pope, the purport of which was to request a number of more Portuguese to deliver Abyssinia from the incursions of the Galla, as they had formerly done from the yoke of the Moors.

He resolves
to embrace
the Catho-
lic religion.

Before any thing of importance could be done in matters of religion, the king was called forth to suppress a rebellion which had already taken place. An impostor had appeared, who called himself *Jacob* the late king, and pretended to have escaped from the battle; but so much wounded in the face that he kept one side of it constantly covered to conceal the deformity. He made his appearance among the mountains of Habab near Masuah; and being joined by great numbers of people, Sela Chrisitos, brother to the king, and governor of Tigré, marched against him. The impostor's troops, though numerous, fled at the first onset; but he escaped to the mountains, where it was very difficult to follow him. This, however, was attempted; and a great many of the posts he had taken were stormed like as many forts; but still the impostor himself, though driven from place to place, found means to make good his retreat to the country lying between the mountains of Habab and the territory of the Baharnagah. Thither he was pursued by Sela Chrisitos; but that general, finding the rebellion likely to spread through the whole province of Tigré, thought proper now to acquaint his brother Socinius with the state of affairs, and to desire his assistance. The king, though at that time he had sent away most of his troops in an expedition against the Shangalla and Gongas, who dwell on the north-west of Abyssinia, set out immediately with such troops as he could collect. These were but few in number; his cavalry particularly, amounting to no more than 530, besides a small reinforcement brought by his brother Emanah Chrisitos, governor of Amhara. As he proceeded, he was informed that a party of Galla were lodged on a hill at no great distance from him. Determining to cut them off, he surrounded the hill where they were posted; but having caused his cavalry to advance before, and pass a deep ravine, they were almost entirely destroyed, while the rest of the army were seized with such a panic that they refused to stir. In this extreme danger, the Galla passed the ravine to attack them; but the king having advanced singly, and killed the first of them, his troops, ashamed of their cowardice, rushed forward on the enemy, and gained a complete victory, which obliged the savages to leave the province they infested at that time.

Abyssinia.
An impos-
tor pretend-
ing to be
the late em-
peror Jacob
appears.

Is defeated.

The misfortune of the cavalry on this occasion quickly occasioned a report that the king had been defeated; of which the impostor Jacob did not fail to take advantage; and descending from his mountains, committed great devastations in the low country. But though attended by a great multitude, who likewise fought with more obstinacy than formerly, he was still defeated by Sela Chrisitos with a force greatly inferior.

The impos-
tor Jacob
again de-
feated.

But before any thing effectual could be done for his reduction, the Galla made a dreadful irruption into the southern provinces, murdering all who fell into their hands, and burning and destroying towns, churches, and villages, in the most dreadful manner. The king bore those excesses for some time with patience, till at last he drew them into such a disadvantageous situation, that being surrounded by his forces, and inferior in number as well as in valour, they were all cut off to a man, with the loss of only 400 on the part of the Abyssinians. Soon after this victory the king underwent the ceremony of coronation. He then march-
ed

An army of
Galla cut
to a man.
Coronation
of the king.

^{Abyssinia.} ed against the impostor Jacob ; but the latter was too sensible of the superiority of his rival to face him in the field. He therefore retired again to his mountains, while the king left the suppression of the rebellion to an experienced officer named Amfala Christos ; who employed two young men, who had been outlawed for murder, to assassinate the impostor. This being done, it was found that the pretended Jacob was no other than a herdsman among those mountains to which he so constantly fled for refuge ; and that he had neither wound nor scar on his face, but had kept one half of it covered to conceal the little resemblance he bore to Jacob whom he personated.

The impostor Jacob assassinated.

Dangerous rebellion begun by Melchizedec.

Defeats one of the king's generals.

Causes Arzo to be proclaimed king.

Is defeated, taken prisoner, and put to death.

The rebellion continues.

The king being now freed from this rebellion, began again to turn his thoughts towards religion. His first step was to make a handsome present to the Jesuits ; but he soon showed his inexperience in religious matters, by attempting to reconcile the two contending parties in his empire. Before he could see the folly of this attempt, however, his attention was called by a most dangerous rebellion, which was begun by one Melchizedec, a servant of the late Sertza Denghel, but a man of great experience in war. He was first opposed by Sanuda, a brave officer ; but being totally destitute of troops, he was obliged to apply to the attendants of the king of Sennaar, who had been deposed by his subjects, and was at that time in Abyssinia. These readily joined him ; and a bloody battle ensued, in which Sanuda was so totally defeated, that he alone had the good fortune to escape, and that grievously wounded, his men being all killed on the spot. On this misfortune Socinius sent his brother Emana Christos with a considerable force to reduce the rebels. Melchizedec finding himself opposed by such an able general, exerted himself to the utmost, in order to raise a force sufficient to resist him ; and in this he succeeded so well, that his army soon struck terror into all the neighbouring country, notwithstanding the presence and known valour of the king's brother. A prince of the blood-royal, named *Arzo*, was likewise found out and proclaimed king, in order to give some sanction to the rebels ; soon after which they boldly marched to meet the royal army. The engagement took place on the 9th of March 1611, and was fought with great obstinacy on both sides ; the advantage even appeared for some time on that of the rebels ; till Emana Christos, perceiving that all was at stake, pushed desperately forward to the place where Melchizedec himself was. The latter seeing no probability of avoiding a single combat, which he did not choose to try, instantly turned his horse and fled ; and the rest of the army soon followed his example. Melchizedec, however, did not much avail himself of this cowardice ; for he was closely pursued by the peasants, taken prisoner, and executed as a traitor, together with several of his principal officers. The fate of Prince Arzo, whom, to support their cause, the rebels had proclaimed king, is not known.

This victory, so far from extinguishing the spirit of rebellion, seemed to have inflamed it beyond all bounds : for news were now received that the whole country round the head of the Nile to the province of Tigré had revolted ; so that there was a necessity for the immediate presence of the emperor himself ; and even this was insufficient, as the rebels were dispersed over

such a large tract of territory. His two brothers, ^{Abyssinia.} Emana and Sela Christos, were therefore both employed against different rebel chiefs, while the king marched against those who were most formidable. The principle on which this war was carried on seems to have been very cruel, viz. that of killing all the men, and carrying off the women and children for slaves. This was rigidly executed, first upon the inhabitants of a mountainous district named *Gusman* on the Nile ; though, at the intercession of the missionary Peter Paez, the women and children, instead of being sold for slaves, were given to the Jesuits to be educated in the Catholic religion. The Gongas and Agows were next attacked with equal success, and still greater cruelty ; one of their tribes, named *Zalabassa*, being almost entirely exterminated : but this, instead of having any good effect, seemed to multiply the rebels still more. The Agows and Galla invaded the provinces in the neighbourhood ; and another impostor, whose true name was *Amdo*, but who pretended to be the unfortunate emperor Jacob, appeared as a competitor for the crown. This last rebel proved much more formidable than any of the rest. He was indeed surprised before he had time to collect any forces ; but Gideon, king of the Jews of Samen, having killed the guards who watched him, set the impostor at liberty, and supported his cause. Thus he soon collected a very formidable army, with which he defeated and killed an officer named *Abram*, who opposed him with a considerable force. This brought Socinius himself against him, who instantly attacked the Jewish monarch Gideon, as being the principal support of his cause. As the country of the Jews was naturally strong, and very full of fortified places, the reduction of it was evidently a very difficult task. The first place attacked was a fortress named *Massiraba* ; which, though very strongly fortified and garrisoned, was soon taken by storm, and every one in it put to the sword without distinction. Hotchi and Amba Za Hancasse, two other strong fortresses, shared the same fate. A fourth, named *Scengannat*, no less strong than any of the former, was also taken ; Gideon himself narrowly escaping with his life in the attack. Discouraged therefore by so many misfortunes, and apprehending the total ruin of his country, this prince at last was content to sue for peace ; which was granted on condition that Amdo should be delivered up. This traitor was condemned to a punishment very unusual among Christians, viz. that of being crucified ; but in nailing him to the cross, his cries and groans so much affected the king, that he ordered him to be taken down and beheaded.

Cruel manner of carrying on the war.

Amdo, another impostor, supported by the Jews.

War with Gideon.

Amdo delivered up and put to death.

Other military expeditions.

The war was now resumed against the Gongas and Guba ; whom the king annually invaded for the purpose of making slaves. In this expedition his officers not only executed their commission against these savages, but likewise carried off a great number of cattle from the Agows, who were then at peace with the emperor. This conduct was highly resented by Socinius, who obliged them to make restitution of what they had taken away ; and the doing them justice in this particular, had more effect in reducing the rest of these people to obedience, than all the cruelties which had been committed since the beginning of the war.

In 1616, the emperor set out on an expedition against the Galla : but this was laid aside on the death of

Abyssinia. of his eldest son, for whom he entertained a great affection. It was succeeded by a very cruel order against the Jews, whom Socinius now determined to exterminate without any apparent occasion. His commands, however, were executed with the utmost punctuality, so that very few escaped; and among the rest perished their prince Gideon lately mentioned. He was supposed to be immensely rich, and to have concealed his riches, which have been sought for in vain by the Abyssinians from that time to the present. The children of the murdered Jews were sold for slaves; and such of the profession as were scattered through the empire, had orders to renounce their religion and be baptized, under pain of death. Thus almost the whole Jewish religion was extinguished at once, as most of them chose rather to embrace Christianity than suffer death. In token of the sincerity of their conversion, they were all ordered to plough and harrow on the Sabbath day.

Successful expedition against the Galla. After this massacre, the expedition against the Galla was resumed, and carried on with the usual cruelty: while the Galla never once appeared to prevent the desolation of their country. Next year, however, a new association was made among these savages, and the empire invaded by them in two different parts at once. One of their armies was cut off to a man before they had time to begin their ravages; while the other fled on the first approach of the royal army, leaving their wives, children, and baggage, to the mercy of the enemy. Thus the king was left for a short time at rest from rebellions or foreign invasions; and this interval he determined to make use of in making war on his neighbour the king of Sennaar, from whom he had formerly received an affront. In this expedition he was assisted by one Wed Ageeb, a prince of the Arabs, who lived on the frontiers of Abyssinia. The allies proceeded with their usual cruelty, killing all the men, and selling the women and children for slaves. Vast numbers of cattle were carried off; and the victorious armies returned with an immense booty. The next expedition was against Fatima queen of the Shepherds, otherwise called *queen of the Greeks*, who resided on the north-east of Atbara. In this also the king proved successful, though less blood was shed than usual: but it was not long before this extraordinary success met with a severe check by the entire loss of an Abyssinian army; the favourite son of the emperor himself being killed in the engagement, with some of the best officers in the empire.

Progress of the Romish religion. Excellent character of Peter Paez. All this time Peter Paez had applied himself with the utmost assiduity to the conversion of the Abyssinians to the Catholic faith; and in this undertaking he had been attended with wonderful success. He was indeed singularly qualified for an undertaking of this kind among a rude and barbarous people: for besides an uncommon share of learning, he possessed an eminent degree of skill in the mechanical arts; by which he was enabled to teach the Abyssinians how to build houses of stone and lime, which they had never known before. In these he was at first mason, carpenter, smith, and architect, himself; and thus, to the astonishment of the whole empire, he built some churches and a palace for the king. His universal genius prepared the people for the reception of his opinions; while the barbarous ignorance and savage man-

ners of his antagonists tended to prejudice every one against their tenets, though ever so just in themselves. Sela Christos, the king's brother, is said to have been converted by only reading the Abyssinian books with attention; in which, it seems, the ignorance of the priests had been displayed in an extraordinary manner. We have already seen how well the emperor himself was disposed towards the Romish church; and his example was followed by many of the principal people of the kingdom. At last the Abyssinian patriarch named *Simon* made a complaint, that irregularities in religion had been committed, and disputes held on matters of faith without calling him, or permission granted him, to support the clergy in these controversies. As Socinius had no high opinion of this priest's learning or eloquence, he did not imagine that any harm could ensue to the cause from granting what he wanted. A public dispute was accordingly appointed; in which *Simon's* inferiority was so apparent, that Socinius now publicly declared his belief in the two natures of Christ.

While the conversion was in this prosperous way, letters arrived from the pope and king of Spain, but without any promise of the temporal assistance which had been solicited; though they assured him of an ally far superior, the Holy Spirit himself, provided the emperor continued firm in his resolutions of embracing the Catholic faith. Socinius would probably have been as well satisfied with an account of a reinforcement of soldiers; but as matters stood, he was obliged to be content, and resolved to submit in form to the pope, renouncing for ever his connexion with the Greek church. As it was improper, however, to send letters on a subject of such importance by a common messenger, proper persons were to be appointed who might occasionally assume the character of ambassadors, and act accordingly. This being resolved on, the next thing was to determine the way by which the ambassadors were to reach Europe. The usual track by *Mafuah* was now shut up on account of the rebellion which existed in the neighbouring provinces; so that the more eligible way seemed to be through *Narea* and the provinces to the southward, by which they might reach *Melinda*, and from thence embark for *Goa*.

The ambassadors were chosen by lot; which falling first on *Antonio Fernandez*, he named *Fecur Egzie* as his companion; and, all things being settled, these two set out for *Gojam* in the beginning of *March 1613*. It seems surprising that the Abyssinian monarch should have sent ambassadors on such a dangerous expedition through barbarous countries, without being accompanied by a proper guard. This, however, seems undoubtedly to have been the case; as we hear of no other attendants than ten Portuguese, whom *Fecur Egzie* took with him, six of whom were to go no farther than *Narea*, but the other four were to proceed to *India*; forty men armed with shields and javelins were also granted, but this force was much too small to answer any useful purpose. *Sela Christos* indeed furnished them with guides from the barbarous nations in the neighbourhood of *Narea*, taking hostages for the security of the travellers; but the insufficiency of these precautions soon appeared. Our travellers had proceeded but two days journey into the country

Abyssinia.

country of the Gongas, when they were treated in such a hostile manner, that one of the Portuguese was obliged to return with Fernandez to complain of the treatment of the savages. On this information Sela Christos instantly dispatched three officers, with a proper number of troops, to chastise them; by which means the ambassadors got safe to Mine, the name of some miserable villages on a ford of the Nile. Here they crossed the river on skins blown up, and next day entered the country of the Pagan Galla; and soon after, though not without great difficulty, they reached the kingdom of Narea, the most southerly province of the Abyssinian empire, but quite surrounded by the Galla. Here they were received with great kindness by the commanding officer of the first fortified place they came to; but on being introduced to the king himself, they met with a very indifferent reception. This was owing to the insinuations of an Abyssinian monk, that they were to bring Portuguese soldiers that way into Abyssinia; which would be destructive to his kingdom. On calling a council, it was resolved to send them into the kingdom of Bali; so that they would be obliged to pass through a much more difficult and dangerous road than what was first intended. Having thus, as he supposed, provided against the danger which threatened his kingdom, he made them a present of 50 pieces of gold, recommending them at the same time to the ambassador from the sovereign of Gingiro, through which they were next to pass.

On leaving Narea, they received a convoy of 80 soldiers to conduct them safely to their next stage; after which they passed four days through countries totally laid waste by the Galla, and where they were obliged to hide themselves for fear of meeting with these savages. Proceeding still through woods and vast chains of mountains, they came to the river Zebee, or more properly *Kibbee*, from its white colour resembling melted butter, as the word imports. Fernandez describes this river as larger than the Nile, and vastly more rapid. They passed it by a kind of bridge, but certainly a most tremendous one. The channel of the river is full of rocks; and betwixt every two of these a single tree was laid, so elastic that it would bend with the weight of one person; while the vast height of the precipice, and the sight of the roaring current below, was sufficient to strike the boldest with terror. At a small distance from this bridge was a ford, through which it was necessary that their mules should pass; which being accomplished without any accident, though with difficulty and danger, they entered the territory of Gingiro. Here they were hospitably received by the sovereign, and after a mutual exchange of presents proceeded to Sangara, the capital of another small kingdom named *Cambar*, which was at this time governed by a Moor named *Amelmal*. During the time of their residence here, one Manquer, a schismatic Abyssinian, arrived, who insinuated to the king that the recommendations they had brought along with them were false. This reduced them to the necessity of staying there till messengers could be sent to Socinius to know whether it was so or not; which occasioned a delay of three months. At last orders were brought to send them off immediately. This favourable answer procured the dismissal of the ambassadors with presents; while the malicious Manquer was detained prisoner. He escaped, however, and

Description of the river Zebee.

overtook them in the next kingdom, named *Alaba*, which was governed by a Moor named *Alko*. Here he accused them of a design to overturn the Mahometan religion altogether: which so exasperated the barbarian, that he threatened them all with death; and actually put them in prison, where some of the Portuguese died. At last, after holding a council, in which Manquer gave his voice for putting them to death, it was resolved that they should be sent back to Amelmal; which was accordingly done, and from his dominions they returned to Abyssinia. Thus ended this memorable embassy, by which the pope was deprived of any authentic documents which might show that any Abyssinian emperor had ever voluntarily submitted to him; and there can be no doubt that this miscarriage, more than any thing else, prevented the establishment of Popery in this country.

Abyssinia.

The ambassador returns.

Socinius had now gone so far in favour of the Catholic party, that he began to share in some measure the fate of Za Denghel, numberless conspiracies being formed against him; which it was undoubtedly owing only to the altered situation of affairs by the preaching and assiduity of Peter Paez, that he was able to withstand. The conspirators were at this time supported, not only by the Abuna, but by Emana Christos himself, the king's brother, whom we have frequently had occasion to mention. Their first step was the very same which had been so successfully taken by Za Sela in the time of Za Denghel, viz. to pronounce sentence of excommunication on the emperor. He was at that time absent on an expedition against the Agows; but returned immediately on hearing what was transacted in his absence; informing the Abuna, that if he did not recal the excommunication without delay, his head should pay the forfeit. This spirited declaration had such an effect, that the anathema was annulled, and his conspiracy dissolved for that time. It was next re-
A number of rebellions on account of religion.

accomplish this purpose it was concerted that they should desire an audience; that Julius should enter first, and present a petition of such a nature as would probably be refused: on this he was to begin an altercation; and during the continuance of it the other two assassins were to come up, and stab their sovereign before he had time to put himself in a posture of defence. Happily for Socinius, however, he was informed of his danger by a page just before Julius made his appearance: on which, instead of refusing the petition, he granted it immediately; so that there was no room for dispute. He then got up to walk; which was scarce done when Emana Christos also came; on which Socinius invited them all to the terrace to walk with him. This prevented their falling upon him at that moment; and as they supposed they would have still a better opportunity on the terrace, they readily consented. But Socinius having opened a private door, at which he entered first, drew it quickly after him; and as this door had a spring-lock, made by Peter Paez, which shut it in the inside, but could not be opened from without, the conspirators were disappointed. Being also sensible that their design had been discovered, they were obliged for some time to keep at a distance, but did not for that reason abandon their wicked projects.

The Abuna excommunicates the emperor.

but is obliged to withdraw his conspiracy dissolved for that time.

Attempt to assassinate the emperor.

Abyssinia. jets. Their next scheme was to be put in execution when the king was absent on an expedition against the people of Sennaar, who had made a violent irruption into the Abyssinian territories. The object now was not the assassination of the emperor, but of his brother Sela Christos; because the emperor had taken the government of Gojam from Emana Christos, who was a schismatic, to give it to Sela Christos, who was a violent Catholic. The enterprise was begun by Julius; who issued a proclamation, that all those who believed two natures in Christ should leave the province of Tigré, where he was governor; and that such as were true friends to the Alexandrian faith should repair to his standard to fight for it. He then ordered the goods of all the Catholics in Tigré to be confiscated; and marched without delay into Gojam, in hopes to surprize Sela Christos. But here the whole scheme was baffled by the vigilance and activity of the emperor; for he having received information of what was going forward, returned into that province before the conspirators had received certain intelligence of his having left it. This so much damped the ardour of Emana Christos and Kessa Wahad, that they stood aloof without attempting any thing till Julius should try his fortune. That rebel was at first very much disconcerted; but soon recovering his courage, advanced to the place where the Nile issues out of the lake of Dembea, where he met with the Abuna. Being confirmed by that priest in his wicked designs, he resolved, by his advice, to fall upon the king before he could be joined by Sela Christos, Simon himself (the Abuna) offering to share his fortune: and to confirm all, a new and solemn excommunication was pronounced against the king and all his adherents. Socinius, alarmed at these proceedings, sent a message to Sela Christos, desiring him to come to his assistance as fast as possible. In the mean time he himself advanced to meet Julius; but chose his posts so judiciously, that he could not be forced to an engagement without great disadvantage on the part of the enemy. Notwithstanding this, Julius pitched his camp close to that of the king, with a design to force him to a battle at all events. This rash action was followed by one still worse. Simon had persuaded him, that as soon as the royal army should see him, they would abandon the standard of the emperor to join his. On this, without farther consideration, he rushed into the camp of Socinius with a very few attendants, and reached the emperor's tent. Here he was known by the guards, and instantly dispatched with all his followers; the whole army betook themselves to flight after his death, and were pursued with great slaughter by the royalists. The plunder of the camp was immense, Julius having brought all his riches, which he had amassed by a long course of extortion, into the field along with him; and all of these were distributed among the soldiers. A vast number of cattle were likewise taken, which Socinius distributed among the priests, judges, and lay-officers. By this complete victory the whole scheme of the conspirators was overthrown. Emana Christos having no forces capable of coping with his brother, and unwilling, as we have said, to assist Julius openly, had retired to a high mountain named *Melca Amba*, in the territory of Gojam. Here he was invested by Af Christos, an experienced general, whom Sela Christos had left govern-

or when he joined the emperor. Emana, who was likewise an expert commander, would have made a vigorous defence; but unfortunately the mountain was so destitute of water, that in three days he was delivered up by his own men to save themselves from perishing with thirst. On being brought to the king, he was tried in a full assembly of judges, and condemned to death; but the king pardoned and sent him to Amhara.

This terrible conspiracy had been occasioned by the dispute concerning the two natures of our Saviour: another quickly followed on account of the dispute concerning the Sabbath-day; the Abyssinian church insisting on the observance of the seventh day of the week as a Sabbath, and the Romish church on the observance of the first day. The author of this rebellion was one Jonael, who had been concerned in the expedition formerly mentioned, in which the A-gows cattle were driven away, and afterwards restored by the king. It is more than probable that his resentment on this account contributed much to increase his zeal on the present occasion; but whatever was the real cause, religion was the sole pretence. He began with a most insolent but anonymous letter to the king; in which the arguments of the Alexandrians for the observance of the Jewish Sabbath were stated, and the contrary doctrine condemned with the utmost virulence of expression. The king himself was reviled in the most opprobrious manner, compared to another Dioclesian, the Jesuits said to be relations of Pontius Pilate, and all of them devoted to hell without redemption. By this stupid performance the king was so much offended, that he added a clause to the former proclamation, commanding that "all out-door work, such as plowing and sowing, should be publicly followed by the husbandman on the Saturday, under penalty of paying a web of cotton cloth for the first omission, the value of the cloth to be 5s.; the second offence to be punished by a confiscation of moveables, and the offence not to be pardoned for seven years." To this Socinius added a speech from the throne in vindication of himself, concerning the part he had taken in religious matters; and to show that he was in earnest, caused the tongue of a monk to be cut out for denying the two natures of Christ, and one of his generals to be whipt for observing the Jewish Sabbath.

In the mean time Jonael having collected what forces he could, openly declared against his sovereign; but not daring to meet him in the field, he retired into the country of the Galla, on hearing that Socinius was approaching him with an army. On this the king entered their territories, and laid them waste; which created a dissension among the savages themselves; one party being for affording him protection, the other for delivering him up. This being made known to the king, he sent a few presents to the faithless barbarians of Jonael's party; who returned his kindness by sending him the head of the rebel, though but a short time before they had fought with their brethren for his rescue.

A more formidable enemy than Jonael, however, still remained. The province of Damot was one of the most disaffected to Socinius in the whole empire; and to this place the greatest part of the religious fanatics

The rebellious spirit of the conspirators continues.

Julius the emperor's son-in-law first appears in arms.

Is deserted by his associates.

Socinius excommunicated a second time.

Rashness and death of Julius.

Emana Christos taken, but pardoned.

Abyssinia.

Another rebellion by Jonael.

He is murdered by the Galla.

Another rebellion.

Abyssinia. natics in other provinces had retired. They now mustered up an army of more than 12,000 men, among whom were 400 monks, all of them armed with shields, lances, and swords; inspired, besides, with such a degree of religious enthusiasm, that they expected to be rendered invulnerable by all terrestrial weapons, and that armies of angels would fight in their cause. Against these Sela Christos was dispatched with about 7000 excellent soldiers; and as the general himself was a zealous Roman Catholic as well as most of his men, we need not doubt that both parties imagined themselves sure of the protection of heaven, and consequently that the encounter would be very violent. The two armies met on the 16th of October 1620; but Sela Christos was unwilling to destroy the infatuated people, who he knew would be unable to resist his veteran troops. He therefore first showed them his superiority in some skirmishes; and then sent a pathetic message, offering a general pardon if they would lay down their arms. The messengers, however, were not allowed to approach, so that an engagement became unavoidable. The numbers of the rebels, as Sela Christos had foreseen, availed very little against the discipline of the veterans he commanded. The 400 monks made a most obstinate resistance; and did not yield till after 180 of them had been killed on the spot.

Desperate enthusiasm of the monks. Socinius, having once more vanquished his enemies, now determined to show his attachment to the church of Rome more openly. Having therefore sent for Peter Paez, he told him his final resolution to embrace the Catholic religion in its full extent; after which he renounced the Alexandrian church in the most explicit manner. His renunciation was followed by a proclamation vindicating his conduct; in which, besides the arguments used for the pope's supremacy, &c. he insisted much on the bad lives of the clergy of the opposite party, and for which it appeared that there was in reality too much foundation. This was the last work of the excellent missionary Peter Paez, who died of a fever immediately after his leaving the king. The example of the sovereign, however, had very little effect upon his subjects. The proclamation was followed by a new rebellion in Amhara. Unluckily the enemies of his brother Sela Christos had persuaded Socinius to deprive him of his government: and there was no other in the kingdom who could be intrusted with such an important commission; so that the king soon found himself under a necessity of replacing and committing to him the charge of the war against the rebels. In this he was attended with his usual success: for the rebel chief, finding himself unable to contend with his enemy, repaired for assistance to the Galla; who no sooner had him in their power than they killed him on the first offer of the imperial general, mangling his body in such a manner that scarce a bit of it remained to be sent to his antagonist.

The emperor publicly renounces the Alexandrian faith. In the mean time news of the revolution in religious matters which had taken place in Abyssinia, arrived in Europe. Though the embassy to the pope and king of Spain could not pass, as has already been related, yet frequent accounts had been otherwise transmitted; which produced such an effect, that a new set of missionaries, with a patriarch (Alphonso Mendez) at their head, were sent to Abyssinia. They arrived

A new rebellion breaks out. at Gorgora, the seat of royal residence, in the beginning of the year 1626; and at the very first audience of the emperor, it was agreed that he should take an oath of submission to the pope. The ceremony was performed with all the splendour that could be contrived: the patriarch then preached a sermon on the pope's supremacy in the Portuguese language, intermixed with Latin quotations; which is reported to have greatly confirmed the faith of the emperor and his brother, though neither of them understood a word of the languages in which it was preached. An answer to this unintelligible discourse was made in the Amharic language, which was equally unintelligible to the patriarch and his attendants; and to this the patriarch added a few words of a reply equally ill understood. At the conclusion of the dispute, an oath of the pope's supremacy was taken by the emperor himself on his knees, then by the princes, and afterwards by all present, according to their different stations. Sela Christos, not contented with taking the oath, drew his sword, and in words not easily understood, denounced vengeance on "those who fell from their duty:" and he likewise added to the oath of supremacy another to the emperor and Facilidas the prince royal; but if the latter should fail in the defence of the Catholic faith, he swore to be his greatest enemy: nor would he be satisfied without imposing this clause upon all the officers, whether civil or military, then present.

Abyssinia. This violent conduct of Sela Christos procured him a number of enemies, and at last was the occasion of his destruction; but that of the king and patriarch set the whole empire in a flame. An excommunication was first pronounced upon all who did not keep the oath: a proclamation was next issued, that all priests should previously embrace the Catholic religion under pain of death; and that every one, under the same penalty, should observe Lent and Easter, according to the rules of the Romish church. The patriarch proceeded in the same style; reordaining the clergy, consecrating the churches over again, rebaptizing the people, even such as were full grown, abrogating circumcision, polygamy, and divorce (for these had been allowed by the Alexandrian church), and reducing the moveable feasts entirely to the rules of the church of Rome.

Though polygamy and divorce are no doubt inconsistent with the pure doctrines of the gospel, yet it was very improper to meddle with these practices at once in such a violent manner. Besides the confusion that this would naturally occasion in private families, these practices gave occasion to many questions in law, which it belonged to the civil judges to decide; but now these were all subjected to the authority of the patriarch: and from some other steps taken by this prelate, it appeared that he intended to encroach much farther upon the civil authority. One of these related to the church lands; which in Ethiopia are granted by the king, and resumed at his pleasure; others being granted in their place, so that neither priests nor monks have any property in them. On the present occasion, an Abyssinian nobleman had possessed some lands belonging to a Catholic monk; for which he was called before the patriarch. On his refusing to submit to this new tribunal, he was instantly condemned to restore the lands; but refusing this also, the patri-

Violent conduct of Sela Christos. arch

An Abyssinian nobleman excommunicated.

^{Abyssinia.} arch took an opportunity, as he was attending the emperor at church, to pronounce sentence of excommunication against him, giving him over at once, soul and body, to the devil.—On hearing this terrible sentence pronounced, the nobleman fainted away, and was with difficulty recovered. On the intercession of the emperor, however, the curse was taken off; but the incident produced a very disagreeable effect on the minds of the people, who from that day began to entertain a greater aversion than ever to the Roman Catholics and their priests. This aversion was greatly increased by the absurd conduct of the patriarch, in ordering the body of an Abyssinian faint to be taken up, and thrown out of the grave in an ignominious manner, because it had been buried under the altar of a church, which he imagined was thus defiled. In all other respects, the patriarch behaved in such an insolent and overbearing manner, that the effects of his oppression soon began to be universally felt, and the Catholic religion began very quickly to decline.—The first stroke given to it was the alteration of the liturgy; which was done at the desire of the emperor. Ever since the establishment of the Catholic religion, the Latin mass book, &c. had been made use of according to the practice of the church of Rome; but as it seemed very unreasonable to impose this at once upon the Ethiopians, Socinius ordered the patriarch to make such alterations in the old Abyssinian liturgies as he thought proper, that the people might thus have an opportunity of paying their devotions in a language they understood. The patriarch, not being able to assign any solid reason to the contrary, was obliged to comply; but no sooner was this done than the people made use of their old liturgies entirely, without the least regard to the innovations of the patriarch. In the midst of the confusion which daily took place from these causes, the Galla made a dreadful invasion, and cut off one of the emperor's generals with his whole army: nor were all the abilities of ^{Sela Christos}, who had so often distinguished himself, sufficient to retrieve matters; so that the savages, after having ravaged the country for some time at pleasure, returned home loaded with booty. This misfortune was followed by the revolt of Tecla Georgis the king's son-in-law; who not only made religion the pretence for taking up arms, but insulted the Catholics in the most outrageous manner; collecting their images and other religious trinkets into a heap, and then publicly setting fire to them. After this he called before him his own chaplain, named *Abba Jacob*, who was a Catholic, stripped him of his pontificals, and killed him with his own hand. A reconciliation with Socinius was now impossible; so that he had no resource but in arms. In this, however, he was equally unsuccessful with the other rebels in this reign; being defeated, taken prisoner, and put to death along with his sister Abdera, notwithstanding the intercession of a Catholic missionary for him, and that of the queen and ladies of the court for his sister.

Body of an Abyssinian faint thrown out of the grave.

Catholic liturgy altered,

An army cut off by the Galla.

Tecla Georgis, the king's son-in-law, revolts.

Is defeated, taken, and executed.

Revolt of the Agows, who set up Melcha Christos.

terminations, but that they were exasperated by the slavery and oppression to which they saw themselves subjected. They now therefore set up Melcha Christos, a prince of the royal blood, as a pretender to the crown; and soon put on such a formidable appearance, that the king himself thought proper to march against them with an army of 30,000 fighting men, which with the servants and other attendants amounted to more than 80,000. Melcha Christos retired with his troops to the craggy mountains of the country; and being imprudently followed by the emperor, rolled down such quantities of stones from the precipices, that Socinius was obliged to retreat with great precipitation, after having lost almost one half of his army.

^{Abyssinia.}

On this defeat the emperor found himself obliged to apply to Sela Christos, whom he had again disgraced and deprived of his government. He succeeded in giving the rebels a dreadful overthrow, which for some time entirely broke their power; but this success was quickly followed by the revolt of ^{Læca Mariam}, a noble relation of the king. He also was defeated, and obliged to retire to a mountain so steep, that though he ascended it in safety, he was dashed in pieces with many of his followers in attempting to descend; the rest, who escaped this danger, being killed by their pursuers. Still, however, the rebel Melcha Christos was unobedient; against whom Prince Facilidas, his heir-apparent to the throne, was sent, having under him a nobleman of most distinguished character named *Keba Christos*. The latter was defeated and killed, without its being in the power of Facilidas to do any thing towards the suppression of the rebellion. This misfortune was followed by the death of ^{Fecur Egzie}, formerly ambassador with Antonio Fernandes to the pope, but now lieutenant-general to Sela Christos. He was cut off with a small body of troops by the Galla; and from many misfortunes befalling the imperial troops, the power of Melcha Christos was augmented to such a degree, that he now began to act as a king, and appointed a deputy-governor to one of the provinces. His opinion of his own importance, however, had almost proved his ruin; for the new governor having appointed a great festival on a Saturday, in opposition to the royal edict, he was attacked by a party of the king's troops, and entirely routed with the loss of 4000 of his men. This defeat was revenged by an overthrow given to Prince Facilidas himself; the blame of which was laid upon Sela Christos. The latter, as we have often had occasion to observe, was not only a most valiant commander, but a rigid Catholic; and these two qualities might naturally have been thought to secure him in favour with the emperor. His violent conduct in regard to the Catholic religion, however, had raised him so many enemies, that accusations were perpetually brought against him; and one disgrace constantly followed another, notwithstanding all his services. The present accusation was brought by one ^{Lefana} Christos, whom Sela Christos had formerly condemned to death. For this offence he had received a pardon from Socinius; and he now revenged himself upon his former judge by accusing him to his sovereign. Sela Christos was not unmindful of this conduct; and therefore, as soon as he had him in his power, put him to death without regarding the pardon he had received. The emperor

The rebels defeated by Sela Christos. Læca Mariam's revolt and death.

Several misfortunes befel the emperor.

A rebel general entirely defeated.

Prince Facilidas defeated.

Sela Christos universally hated.

Abyssinia. on this deprived him of the government of Gojam, which he gave to Serca Christos, who was supposed to be a dependent on Prince Facilidas, and was besides cousin to the emperor himself. The new governor, on his entering upon office, promised solemnly to support the Catholic religion; but no sooner did he arrive in Gojam, than he solicited Prince Facilidas to rebel against his father, and re-establish the Alexandrian faith. This was not the only instance in which he showed his disobedience. He had received the charge of a caravan which came annually from Narea; but instead of acting properly in this respect, he employed himself in driving off the cattle of the Agows and Damots, who expected no harm, and were consequently quite unprepared. Such numbers of them were carried off on this occasion, that 100,000 are said to have been sent to the Abyssinian market. Socinius, when informed of such an atrocious robbery, ordered him to restore the cattle, and to surrender himself prisoner; but instead of complying with this order, he again solicited Facilidas to revolt against his father. For this he was sharply reprov'd; but now, determined to make the world believe that the prince had entered into his schemes, he sent a public message to him, in which he was desir'd to come and take possession of the kingdom. Facilidas imprisoned the person who brought this treasonable message, and soon after sent him to Socinius; but Serca Christos still persisted in his mad attempts. He now propos'd to abolish the Romish religion throughout the kingdom; and with that view attacked a convent which Sela Christos had built in Gojam: but the fathers having been furnished with some fire-arms, made so good a defence, that he was oblig'd to give over the enterprise. He then took the last step to complete his folly, by openly revolting against the emperor, and setting up a prince of the blood-royal in opposition to him, whom he had found living in obscurity among his mother's relations. To cut off all possibility of reconciliation with the emperor, he renewed the sacrilegious practices of Georgis, and put to death a priest for refusing to deny the two natures of Christ. Thus he procur'd a multitude of enthusiasts to join him; but when the affair came to a decision, and Prince Facilidas with a well-disciplin'd army was sent against him, it then became evident how little the fanaticism of a tumultuous rabble availed against the skill of a regular army. The rebels fought, however, with great obstinacy till most of them were killed, their commander being oblig'd to take refuge on a mountain; from whence being unable to make his escape, he at last came down and surrendered at discretion. We need not doubt of his fate; but notwithstanding the execution of this rebel, another still remained. This was Melcha Christos, against whom the emperor next prepar'd to march. He now found, however, the bad consequences of having acted so violently in favour of the Catholic religion. His army was so disaffected, that he could scarcely put any confidence in them. For this reason he issued a proclamation, that such as chose to observe the Wednesday as a fast instead of Saturday, had liberty to do so. This and some other indulgencies being reported to the patriarch, the latter sharply reprov'd him as committing an encroachment on the priesthood: and put him in mind of the pu-

Deprived of the government of Gojam. Revolt of the new governor.

He is defeated, taken and put to death.

The emperor relaxes in his severity concerning religion, which is resented by the patriarch.

nishment of leprosy inflict'd upon Uzziah for assuming the priest's office. Thus an altercation commenced; and it was evident, from the behaviour of Socinius, that his extreme favour for the Romish religion began to decline. After this he set out for the country of Lafta, where Melcha Christos was, and the entrance to which was guarded by very high and rugged mountains. Among these the rebels had strongly fortified themselves; but were driven from four posts by the king's troops, so that the latter imagin'd a complete victory had been gain'd. Assembling themselves, however, on the top of another high mountain, the rebels watch'd their opportunity; and descending suddenly upon them, cut off great numbers, and oblig'd the rest to make a precipitate retreat. Another campaign was therefore necessary; but now the army lost all patience. They were become weary of making war on their countrymen, and, after slaughtering them in the field, seeing the intervals between the campaigns fill'd up with numerous executions of those who had escap'd the sword. A deputation was therefore sent from the soldiers by Prince Facilidas, who, though he had never declar'd his sentiments openly, was strongly suspected of being no friend to the Catholics. The purport of the deputation was, that they did not mean to say that the Romish profession was a bad one, but it was such as they could not understand; and consequently there could be no merit on their part in professing it. They were ready, however, to lay down their lives for the public good, provided their ancient religion was restor'd; but this was a point they would not give up, and without which they would neither concern themselves in the quarrel, nor even wish success to the emperor's arms. With regard to the Romish religion, they added this declaration, perhaps the strongest possible mark of aversion, that they did not wish to know any thing about it. Socinius, therefore, according to the Abyssinian accounts, promis'd to restore the Alexandrian faith, on condition that he return'd victorious from Lafta. The army then readily agreed to follow him wherever he pleas'd; while the rebels, having left their fortresses in Lafta, probably from a confidence in their own strength, boldly march'd towards the royal army. In the engagement, however, they did not show their usual alacrity, and were soon defeat'd with the loss of 8000 men. Many of their best officers were kill'd on the spot, and Melcha Christos himself escap'd only by the swiftness of his horse.

Abyssinia.

The emperor defeat-ed.

The army require the restoration of the Alexandrian faith.

Melcha Christos defeat-ed.

By this victory the power of the rebels was broken; but it was not attend'd with the same satisfaction to the people with which other victories were wont to be accompany'd. On viewing the field of battle along with Facilidas next day, the prince is said to have made a pathetic speech to his father; in which he told him, that the bodies of the men he saw dead on the field of battle were neither those of Pagans nor Mohammedans, but of his own Christian subjects; and that victories of this kind were like driving a sword into his own entrails. " * How many men (says he) have you slaughter'd? how many more have you yet to kill? We are become a proverb even to the Pagans and Moors for carrying on this war; and for apostatizing, as they say, from the faith of our ancestors." The king did not make any reply at that time; but the effects of the

Pathetic speech of Prince Facilidas to his father concerning the war.

*** Bruce's Travels, vol. ii. p. 943.**

prince's

Abyssinia. prince's words were soon apparent. The patriarch took the first opportunity of upbraiding him with his ingratitude to the Catholics, and deserting the religion whose professors had by their prayers obtained such a signal victory. To this Socinius replied in general, that he had done every thing in his power to establish the Catholic religion; for which he had shed the blood of thousands, and had still as much more to shed: but that he should consider of the matter, and acquaint him with his final resolution. This was by no means favourable; for next day, in a message to the patriarch, he recounted the many rebellions which had been excited on account of religion; and concluded with telling him, that though the faith of Rome was not a bad one, yet the people of Abyssinia did not understand it. For this reason he was determined to grant a toleration, by allowing such as professed the Catholic faith to do so in peace, and such as rather chose that of Alexandria to do the same. The patriarch replied, that he had no objection to grant this indulgence to such as had not yet embraced the Catholic faith; but those who had done so could not be permitted to renounce it without a grievous sin. Thus a new system of persecution would have commenced: but the emperor, understanding well the purport of his discourse, replied, that if this was the case, he was no longer master of his own kingdom; and immediately afterwards issued a proclamation, wherein he declared the Alexandrian faith restored, with the altars for the sacrament, liturgy, and every other thing belonging to it; at the same time, that being now old and infirm, he himself resigned the crown and empire to Facilidas.

An universal toleration granted. Opposed by the patriarch.

The emperor restores the Alexandrian faith, and resigns the kingdom.

The new emperor an enemy to the Catholics.

The patriarch commanded to quit Abyssinia.

This remarkable proclamation was made on the 14th of June 1632; after which Socinius took no farther care of public affairs; nor did he long survive this transaction. He died on the 7th of September this year, and with him fell all the hopes of the Jesuits. Facilidas, as had been rightly conjectured, was an inveterate enemy to the Catholic faith. As soon therefore as he had obtained the government, even before he took upon himself the title of king, the Catholics were everywhere displaced from offices of trust and honour; but as soon as he found himself established on the throne, a letter was sent to the patriarch, informing him, that as the Alexandrian faith was now restored, it was become indispensably necessary for him to leave the kingdom, especially as the new Abuna was on the way, and only deferred his journey till the Romish priests should be out of the country. For this reason he commanded the patriarch, with all his brethren, to leave their convents throughout the empire, and retire to Fremona in the kingdom of Tigré, there to wait his further pleasure. The patriarch attempted to soften him by many concessions, but in vain; on the 9th of March 1633 he was ordered, with the rest of the fathers, to proceed immediately for Fremona. This they were obliged to comply with; but the emperor, understanding that they were about to establish themselves, and to solicit succours from Spain to accomplish their purposes by force, he sent orders to the patriarch instantly to deliver up all the gunpowder they had at that place, and to prepare without delay to set out for Masuah. Still the infatuated and obstinate priest determined not to comply with the emperor's orders. At last he thought proper to deliver up the gunpowder;

but resolved to leave his companions behind him, and to disperse them as much as possible through the empire, in case he himself should be obliged to embark at Masuah; which, however, he did not by any means intend. For this purpose he applied to the Baharnagash, named *John Akay*, then in rebellion against the emperor; who carried them all off from Fremona in the night time, under a guard of soldiers, and lodged them safely in a strong fortress named *Adicotta*. Here the patriarch imagined that he might remain in safety till he should be able to procure succours from India. In this, however, he was deceived. John conveyed them from place to place, through many unwholesome situations, till their strength as well as their patience was exhausted. At last, on receiving a present of gold, he allowed them to return to their old habitation *Adicotta*. Facilidas, then, being determined at all events to get rid of such troublesome guests, endeavoured to prevail upon John by bribes to deliver them into his hands. John was too delicate to comply with this request, which he supposed would be a violation of hospitality; but he consented, on receiving a proper compensation, to sell them to the Turks. Two were left in Abyssinia, in hopes of soon sharing the crown of martyrdom; and this indeed Facilidas did not delay to put them in possession of, both being ordered for execution as soon as he got them into his power. Not content with this, and being perpetually apprehensive of fresh invasions from Europe, he entered into a treaty with the Turkish bashaws to keep the ports of Masuah and Suakem shut against them; by which their entrance into Abyssinia would be effectually prevented.

Abyssinia. He applies for protection to the Baharnagash, then in rebellion.

The patriarch and other missionaries sold to the Turks.

Sela Christos put to death.

During these transactions, the emperor took the most effectual methods otherwise to eradicate the Romish religion, by cutting off the principal persons who professed it, or obliging them to renounce their profession. The principal of these was his uncle Sela Christos, who had deserved so well of the late emperor Socinius, and of the whole empire in general. His excessive bigotry in religious matters proved the cause of his destruction, as has formerly been hinted. When it was proposed to him to renounce his faith, he absolutely refused to do so, either to avoid the greatest punishment the king could inflict, or to obtain the greatest gift he had in his power to bestow. On this he was banished to an unhealthy district among the mountains of Samen; but as even here he kept up a correspondence with the Jesuits, and wished to facilitate the introduction of more Portuguese from India, he was sentenced to be hanged on a cedar tree.

The expulsion of the present race of missionaries did not entirely discourage the Europeans from attempting to introduce a fresh mission into Abyssinia. The obstinate, haughty, and rebellious spirit of the Jesuits was universally condemned, and regarded as the cause of the extreme aversion showed by the emperor and the whole empire against the doctrines they professed. It was therefore hoped, and not without some appearance of reason, that the point might still be gained, provided the mission were undertaken by others less violent and insidious in their behaviour. After the execution of those who remained in Abyssinia, six Capuchins, the reformed order of St Francis, were sent with protection from the Grand Signior to facilitate their passage into Capuchins.

A new mission undertaken by six Capuchins.

Abyssinia. Agows to their side, the disturbances were renewed. A grandson of Socinios, who had fled to the Galla when Facilidas first banished the princes to Wechne, was proclaimed king. A multitude of savages immediately flocked to his standard, so that he was soon at the head of a very formidable army, while the Agows and other malcontents were ready to join him as soon as he should repass the Nile. The king, however, entirely disconcerted the scheme by his activity; for, advancing with the utmost celerity, he reached the banks of the Nile before the Galla on the other side were ready to join their allies on this side of it. The Agows were so confounded at his presence, that they allowed him to pass the river unmolested. The Galla were equally surpris'd at seeing the war transferred into their own country; and, with their usual fickleness, deserted the prince whose cause they had pretended to espouse. A few remained faithful, but were utterly defeated by the forces of Yafous; the unhappy prince himself, whose name was *Isaac*, being taken prisoner, and put to death in the presence of his rival. After this, many great exploits were performed against the rebellious Agows, Galla, and other savages: but which, as they produced no other consequence than that of establishing the emperor's character for personal valour and military skill, we shall here pass over; only remarking, that, in the opinion of his subjects, one of his campaigns was the most glorious ever recorded in the annals of Abyssinia. The most memorable events in the present reign regarded religion, and a renewal of the correspondence betwixt Europe and Abyssinia; of which we have a particular account from Mr Bruce, to the following purpose. About the end of the 17th century, a number of Franciscans from Italy settled at Cairo in Egypt, and were maintained at the expence of the fathers in Palestine, though pretending to be independent of their superior the guardian of Jerusalem. The latter, displeas'd at this method of proceeding, offer'd to supply the mission to Egypt entirely at the expence of Palestine, and likewise to furnish from thence missionaries capable of instructing the people in the Christian religion. This propos'd meeting with a favourable reception at Rome, a new set of missionaries from Jerusalem, call'd by our author *Capuchins*, appear'd at Cairo; from whence the Franciscans were banish'd, only two of them being allowed to remain in that city. The others return'd to Rome; where, finding that they could not re-establish themselves by fair means, they had recourse to artifice and fiction. It was now pretended, that, on the expulsion of the Jesuits from Abyssinia, a great number of Catholic Christians had fled into the neighbouring countries of Nubia and Sennaar, where they found themselves so grievously oppress'd by the Mahometans, that, without some spiritual assistance, they would be under the necessity of renouncing their religion. This story being confirm'd by the two Franciscans who remain'd at Cairo, the cause of these suppos'd Christians was eagerly espous'd by the religious in Italy, and a new mission set on foot at the expence of the pope for their relief, which continues to this day under the title of the *Ethiopic Mission*. The missionaries had it also in charge to penetrate if possible into Abyssinia; and to keep up, as far as was in their power, the Catholic faith, until a better opportunity

Quell'd
by the em-
peror.

Attempt
to revive
the religio-
us missions
from Eu-
rope.

should offer of making an attempt to convert the whole empire. For this purpose a convent was procur'd for them at Achmim in Upper Egypt; and permission was granted, notwithstanding their former banishment, to settle two of their order at Cairo independent of the fathers of Palestine.

While these transaCTIONS pass'd in Italy and Egypt, Louis XIV. of France was in the height of his glory. He had attempted to rival the ancient Greeks and Romans in the magnificence of his works; but his conduct with regard to religion, his persecution of the Protestants, and revocation of the edict of Nantz, had stigmatiz'd him throughout the greatest part of Europe as a bloody and mercilefs tyrant. To wipe off this stain, the Jesuits, his great spiritual directors, form'd a scheme of inducing the emperor of Abyssinia to send an embassy to France; after which they hop'd that they might get themselves replac'd in the Ethiopic mission, to the exclusion of the Franciscans. The king, whose pride was very much flatter'd by the propos'd, readily embraced it; but the pope's consent was still necessary. His holiness was by no means pleas'd with this intrusion of a temporal prince into spiritual affairs: nevertheless, he did not chuse to enter into any contest; but that he might undo with one hand what he did with the other, he appointed six Jesuits, of whom Verseau, the ambassador of Louis to himself, was one, to be missionaries to Abyssinia, but the superior of the Franciscans to be his legate *à latere* at that court; providing him with suitable presents for the emperor and principal nobility.

The Jesuits now finding themselves in danger of being supplanted by the Franciscans, apply'd to the pope to know which of the two orders should make the first attempt to enter Abyssinia; but received no other answer than that those who were most expert should do so. Verseau, probably displeas'd at this conduct of the pope, went to a convent in Syria of which he was superior, without making any attempt to enter Ethiopia: therefore the mission remain'd in the hands of two persons of opposite professions, a Jesuit and Franciscan; the name of the latter being *Paschal*, an Italian; and of the former *Breudent*, a Frenchman. The latter was accus'd of a man of learning and probity, zealous in the cause of his religion, but by no means imprudent or rash in his attempts to promote it.

In the mean time an unforeseen accident procur'd admittance to the missionaries into Abyssinia more readily than could have been expected in the present situation of affairs. Yafous and his son had both been attacked by a scorbutic disorder which threaten'd to turn to a leprosy; on which one Hagi Ali, a Mahometan factor at Cairo, receiv'd orders to bring with him an European physician on his return to Abyssinia. It happen'd that this man had formerly been acquainted with Friar Paschal, who had administer'd some medicines to him. He now propos'd that Paschal should accompany him to Abyssinia in the character of a physician; and that Friar Anthony, another of his own order, should go with him as his companion. But this scheme was frustrat'd by Maillet the French consul, who had the charge of the whole from Louis XIV. and wish'd that the Jesuits alone should have the conduct of the mission. For this purpose he represent'd

Abyssinia.

Yafous falls
sick, and
sends for an
European
physician.

Friar Pas-
chal an-
other Fran-
ciscan un-
dertake the
office.

Abyssinia. to Hagi Ali, that Friar Paschal understood nothing of medicine; but he promised to furnish him with another, whose skill he extolled above all those of ancient or modern times. Hagi Ali, who knew nothing of the matter, readily agreed to Maillet's proposal; and Charles Poncet a Frenchman, who had been bred a chemist and apothecary, was appointed to the office of physician, with Father Brevedent to attend him as his servant. Thus the scheme of the Franciscans was for the present overthrown: but unluckily Maillet employed one Ibrahim Hanna, a Syrian, to write letters to the Abyssinian monarch and some of his principal nobility, which he desired him to submit to the inspection of one Francis, a Capuchin or monk of the Holy Land, and consequently an enemy to the Franciscans. Ibrahim, not being acquainted with the monk he mentioned, and thinking any other would answer as well, carried the letters to one of the same name, but of the Franciscan order. Thus the whole secret was divulged at once; and the Franciscans, with the malevolence essential to such religious miscreants, resolved on the destruction of Poncet and his attendants. At present, however, their sanguinary intentions were defeated; Poncet set out immediately after he had received his commission, and arrived safe at Gondar the capital of Abyssinia, with his attendant Father Brevedent, on the 21st of July 1699. Brevedent died on the 9th of August; but Poncet lived to execute his commission, by making a full cure of his royal patient. On the 2d of May 1700, he set out on his return for Europe, and arrived at Masuah without any bad accident.

It has already been observed, that the main end of this undertaking was to procure an embassy from Abyssinia to the French monarch; and this end also was gained. An ambassador was procured, but unluckily not such a one as M. Maillet the chief manager of the whole project desired. This man, intoxicated with absurd notions of nobility and distinctions of rank, could not make allowance for the difference between the appearance of an ambassador from a barbarous monarch, however powerful, and one from the sovereign of a civilized and polite nation. The ambassador sent by Yafous, therefore, having been originally no other than a cook, could not be agreeable to a man of such a disposition. The presents sent by the Abyssinian monarch indeed, had they arrived, would have probably conciliated matters. These were, an elephant, some Abyssinian young women, &c. but unluckily the elephant died, and the ambassador was robbed of all the rest by a Turkish bashaw. Maillet, therefore, naturally proud, imperious, and covetous, thought proper to call in question the authenticity of Morat the ambassador's mission, to call Poncet himself a liar, and not to allow the former to proceed to France. The transactions on this occasion are set forth at length by Mr Bruce, greatly to the disgrace of Maillet; but as details of this kind would swell the present article beyond due bounds, we must refer the curious reader to the work just mentioned.

Thus the scheme of procuring an embassy from Abyssinia having proved abortive, the next project of the Jesuits was to get an embassy sent from France, whose object was to be the cementing a perpetual peace betwixt the two nations, and to establish a lasting and

commercial intercourse; though, whatever friendship or good-will might take place, it was evident that there was not a single article that could be exchanged between them, nor was there any ready communication betwixt the two countries either by sea or land. The person pitched upon as ambassador was M. de Roule, vice-consul at Damietta. He is characterized by Mr Bruce as "a young man of some merit, who had a considerable degree of ambition, and a moderate skill in the common languages spoken in the east; but absolutely ignorant of that of the country to which he was going, and, what was worse, of the customs and prejudices of the nations through which he was to pass. Like most of his countrymen, he had a violent predilection for the dress, carriage, and manners of France, and a hearty contempt for those of all other nations: this he had not address enough to disguise; and this endangered his life." Besides these disadvantages, he had the misfortune to be under the displeasure of all those of his own nation who resided at Cairo; so that the merchants were very much averse to his embassy; and, as the Franciscans and Capuchins were his mortal enemies; he had not a single friend in the world except Maillet and the Jesuits. Unluckily the consul misled him in one of the most material articles, and which was undoubtedly of the utmost consequence to him in the accomplishment of his purpose, viz. the presents necessary to be taken with him for the barbarous people through whose country he was to pass. Brocades, satins, and trinkets of various kinds, according to Mr Bruce, were the proper wares; but, instead of this, he had taken along with him mirrors of various kinds, with the pictures of the king and queen of France, wearing crowns upon their heads. The former of these subjected him to the imputation of being a magician; while the latter, if shown to a Mahometan, would bring upon him the charge of idolatry. The worst misfortune of all was the malice and treachery of the Franciscans, who had already prejudiced against him the people of the caravan with whom he was to go, the governors of the provinces through which his road lay, and the brutal and barbarous inhabitants of Sennaar, who lie in the way betwixt Egypt and Abyssinia. The consequence of all this was, that he was murdered at the last-mentioned place with all his retinue. The Franciscan friars, who had preceded him to Sennaar, left it before his arrival, and returned immediately after. There cannot therefore be the least doubt that they were the authors of his murder; though the bigotted disposition of Louis XIV. prevented all inquiry into the matter; so that the particular steps they took to accomplish their designs were never published to the world.

The assassination of De Roule was preceded by that of Yafous emperor of Abyssinia, who fell by a conspiracy of his wife and son, occasioned by a fit of jealousy in the former. He was succeeded by his son Tella Haimanout, who had conspired against him. Before his death, he had dispatched a message to the king of Sennaar, requiring him to afford M. de Roule protection at his court, and a safe conduct from it; but when the messenger was within three days journey of the capital of that kingdom, he received news of the assassination of Yafous. On this he returned.

Abyssinia.
Disappointed by M. Maillet.

Poncet and Brevedent appointed.

The Franciscans resolve the destruction of the missionaries. Poncet sets out on his return after curing Yafous.

The Abyssinian ambassador disagreeable to M. Maillet.

He is not allowed to proceed to France.

Abyssinia.

M. de Roule sent ambassador from France.

He is murdered.

Yafous assassinated.

Abyssinia. turned in great haste to Gondar, in order to have the letters of protection renewed by Tecla Haimanout the reigning prince. This was readily done: but before the messenger could reach Sennaar, he was informed that De Roule was already assassinated; on which he returned with still greater haste than before. The Abyssinian monarch, provoked at such a scandalous violation of the law of nations, declared his intention of commencing hostilities against the king of Sennaar; and for this purpose assembled his army. But this was scarce done, before he was informed that a rival, named Amda Sion, had been set up against him by the friends of his father Yafous, and had been for some time privately collecting troops to surprize him before he could be ready to make any opposition. It was therefore necessary to employ the army destined against Sennaar to reduce this rebel to obedience; and fearce was this done, when the emperor himself was assassinated; so that all thoughts of revenging the death of M. Roule were laid aside.

The new emperor intends to revenge his death;

but is himself murdered.

Reign of Theophilus.

Execution of the queen and other regicides.

Tigi revolts, but is defeated, taken and put to death.

Line of Solomon set aside.

Tecla Haimanout perished in 1706, and was succeeded by his uncle Tifilis, or Theophilus; whose first care was to apprehend all those suspected to have been concerned in the death of his predecessor. Thus the murderers of Yafous, whom Tecla Haimanout had instigated, imagined themselves secure, and came to court without any fear of danger: but no sooner did Theophilus get them into his power, than he caused them all to be put to death without exception; the queen herself being publicly hanged on a tree. Not satisfied with avenging the death of Yafous by the execution of his murderers, he did the same with those of Tecla Haimanout; putting to death all who were immediately in his own power, and commanding the governors of the provinces to do the same with those whom they could find within their jurisdiction. One of these named Tigi, who had been formerly Betwudet, having escaped into the country of the Galla, raised a very considerable army, with which he invaded Abyssinia, where he committed the most dreadful cruelties. Theophilus engaged him on the 28th of March 1709; when, with a force greatly inferior, he gained a complete victory. A number of the Galla fled to a church, hoping to be protected by the sanctity of the place; but the emperor telling his soldiers that it was defiled by those who were in it, commanded it to be set on fire, so that every one perished. Tigi, with his two sons, were taken prisoners, and put to death. The king himself did not long survive his victory; falling sick of a fever, of which he died in September 1709.

After the death of Theophilus, the line of Solomon by the queen of Sheba was superseded a second time, and a stranger of the name of *Oufas* seated on the Abyssinian throne. The extreme severity of Theophilus in punishing the murderers of both Yafous and Tecla Haimanout gave occasion to this; for as both princes had been assassinated in consequence of conspiracies formed by the principal people of the nation, the number of conspirators was so great, that the parties concerned had interest sufficient to influence the election of the new monarch even in this most capital respect, of his not being a descendant of Solomon. Excepting this single defect, he was in every respect worthy of

the kingdom, and was already the highest subject in it. **Abyssinia.** Scarce was he seated on the throne, however, when a dangerous conspiracy was formed against him by the very persons by whom he had been placed upon it. Oufas baffled their designs, by seizing the principal conspirators before they had time to bring their schemes to a bearing: and several people of the first rank were condemned to lose their noses, or to be put to death. After this, the emperor undertook an expedition against the Shangalla, according to the barbarous custom of the Abyssinian monarchs, who hunt these poor people merely for the sake of making slaves; slaughtering the men without mercy as well as many of the women, and carrying off only the boys and girls into captivity. In this he met with perfect success; and was about to attempt the conquest of the whole country, when he was called back by the news that his prime minister Tafa Christos was dead. While the emperor remained in his capital at Gondar, he was taken suddenly ill; which he at first imputed to witchcraft, and therefore used some antidotes; among which the smoking of the palace with gunpowder was one. But this was done so carelessly by the servants, that the whole building was consumed; an accident looked upon by the people in general as a very bad omen, especially as the king's complaint increased every day. At last the principal officers came to pay him a visit of condolence, as they pretended; but in reality to observe the nature of his distemper, and to consult whether or not it was likely to continue till they could fall upon means to deprive him of the government. Oufas understood their intentions, and therefore summoned all his strength to assume for a moment the appearance of health; so that the officers found him as usual engaged in business. Being thus disconcerted, it became necessary to make some apology for a visit so extraordinary and formal; for which they were at first somewhat at a loss: on recollection, however, they told him, that, hearing he had been sick, which they happily found was not the case, they had come to make a proposal concerning the succession; professing a desire that he would quiet the minds of his own family, and of the people in general, by appointing his son Fasil successor to the throne after his decease. Oufas gave them an equivocal answer; but the discourse concerning Fasil happening to be overheard by the soldiers, a violent mutiny ensued, and all the officers who had come to visit Oufas were killed. Part of the town was set on fire in the confusion; and at last a proclamation was made, that David son of Yafous was king of Abyssinia. The prince was then sent for from the mountain, and arriving at Gondar, was crowned on the 30th of January 1714. The distemper of Oufas in the mean time continuing to increase, he died on the 10th of February the same year.

The emperor falls sick.

Oufas deposed, and David proclaimed emperor.

Death of Oufas.

Reign of David.

The new emperor was a rigid Alexandrian in principle; but Oufas had been so far favourable to the Catholics, as to entertain some of their priests, though in a private manner. As it was the custom, however, to call a convocation of the clergy on the accession of every new emperor, the monks and others insisted upon one being called on the present occasion; the more especially that a new Abuna was come from Egypt, and the lenity shown to the Catholics by Oufas had excited the jealousy of the Abyssinian clergy in the highest

^{Abyssinia.} highest degree. This assembly proved fatal to three Romish priests, whom Oufas had protected and supported for some time. They were brought before the king and Abyssinian clergy; who shortly asked them, whether they believed that the council of Chalcedon was to be accepted as a rule of faith, and that Pope Leo lawfully presided in it? To both these questions they answered in the affirmative: on which, without farther trial, they were condemned, to be stoned; and the sentence was instantly put in execution by the furious and ignorant multitude, only one person in the whole assembly exclaiming against it as unjust. The priests being thus gratified in one instance, insisted that Abba Gregorius, who had acted as an interpreter to the three just mentioned, should also be put to death; but this was prevented by David, who found, upon inquiry, that he had only done so in obedience to the express commands of Oufas his sovereign.

Three Romish priests put to death.

Here we must take notice, that though the faith of Abyssinia is always said to be the same with that of Alexandria, it is not for that reason to be imagined that the clergy are all of the same mind. On the contrary, many different parties exist among them, who hate one another no less than all of them do the church of Rome. The principal of these in the time we speak of were the monks of Debra Libanos and those of St Eustathius, to which last the emperor himself belonged. On the arrival of a new abuna, it is customary to interrogate him before the emperor and assembly of the clergy, which of the two opinions he adheres to. The emperor at present, not thinking his presence necessary, sent the betwudet with the principal persons of both parties to hear the profession of the new abuna, which was afterwards to be proclaimed to the people. The latter, probably not willing to contend with either party, gave an equivocal answer. But with this the king himself was dissatisfied; and therefore, without consulting the abuna farther, he caused it to be proclaimed, that the new abuna's profession was the same with that of the monks of St Eustathius. This was highly resented by the monks of Debra Libanos, who instantly ran to the abuna, and from him received a profession directly contrary to what had been proclaimed by the king's order. Not satisfied with this, they continued their tumult, disregarding the imminent danger they were in of falling under the king's displeasure. One of their number was so infatuated as to cry out, that he saw a cherub with a flaming sword guarding the door of the house where they were. Unluckily, however, they continued their assembly so long, and behaved in such a seditious manner, that the emperor sent against them a body of Pagan Galla; who fell upon them sword in hand, killed upwards of 100 of the ringleaders, and then falling out into the street, destroyed indiscriminately every one they met.

Dissensions among the Abyssinian clergy.

Great massacre of the clergy and others.

The king poisoned.

The massacre continued till the next day at noon, when a stop was put to it by the king's proclamation. The vast quantity of blood so wantonly shed, however, could not but occasion great discontent throughout the capital, and the bad effects of it soon appeared. The king was universally hated, and numberless conspiracies were talked of; but before any pretender to the crown appeared, David himself fell sick, the cause of which was found to be poison. The perpetrators of

this crime being known, were instantly put to death; but nothing could save the life of the emperor, who died the 9th of March 1719 in great agony.

^{Abyssinia.}

David was succeeded by his brother Bacuffa; who in the beginning of his reign proved very severe and cruel, cutting off almost all the nobility who could be supposed to have had any share in the conspiracies and seditions of former reigns. In the latter part of it he became much more mild, and was beloved by his subjects. He was succeeded in 1729 by his son Yafous II. who continued long under the regency of his mother; and as soon as he took the management of affairs upon himself, was disturbed with continual seditions and rebellions. In one of these the city of Gondar was made a field of battle, and was so frequently set on fire, as to be almost entirely reduced to ruins. Having at last succeeded in reducing all his enemies to obedience, he encouraged and promoted the arts of peace, repairing and ornamenting his palaces, in which he employed some Greek artists. For this he renounced the diversion of hunting, and the barbarous expeditions against the Shangalla: but this way of life proved so disagreeable to his turbulent subjects, that a severe satire was published against him, under the title of "The expeditions of Yafous the Little." Indignant at this reproach, he determined on an expedition against the kingdom of Sennaar; and having made the necessary preparations, invaded it with a formidable army, without the least pretence of provocation, or making any declaration of war. As he proceeded into the country of the enemy, he allowed his soldiers everywhere to exercise the greatest cruelties, to destroy every living creature with the sword, and every thing combustible with fire. Some of the Arabs joined him as he went along; many more fled from his presence; and a body of them tried to oppose him. These last were utterly defeated; and Yafous without delay prepared to march to Sennaar the capital of the kingdom.

^{Reign of Bacuffa.}

^{Of Yafous II.}

^{Cultivates the arts of peace.}

^{Is lampooned by his subjects, and undertakes an expedition against Sennaar.}

As he still went on, the king Baady being assisted by Hamis prince of a territory named *Dar Poor*, surprised one division of his army so effectually, that they were all cut off to the number of 18,000. Yafous, however, still continued his destructive progress; though he gave over all thoughts of reducing the capital, or subduing the kingdom. He returned triumphant to Gondar, making a great show of the plunder he had acquired; though the dejected countenances of many of his army showed that they were by no means pleased with expeditions of this kind. The king himself was supposed to behold the distress of his subjects on this occasion with a malicious pleasure, on account of their impatience and turbulence in times of peace, and their forcing him into a war when he had no inclination for it. In a short time, however, the people were perfectly comforted for the loss of their brethren. In the late unfortunate action they had lost all those holy utensils, which it is usual in Abyssinia to carry into the field of battle in order to ensure victory. Among these was a picture of the crown of thorns which was put upon our Saviour's head; some pieces of the true cross upon which he suffered; a crucifix which had spoken on many occasions; with many other sacred relics of equal value. Soon after the battle all these were redeemed by the priests at an extravagant rate; no less than 8000 ounces of gold having been given

^{A division of his army cut off.}

^{Religious utensils redeemed at an extravagant rate.}

M for

Abyssinia. for the speaking crucifix; and for the rest, we are to suppose a proportional price had been paid. On the arrival of this trumpery at Gondar, the greatest rejoicings were made, and Yafous was astonished at the people having so soon forgot the loss of their countrymen and relations.

The messengers sent for the new abuna insulted and robbed.

A stated tribute for the passage of the abuna.

The emperor determines to punish the naybe of Masuah, but is prevented. War with Michael governor of Tigré.

Michael obliged to capitulate.

Soon after these transactions the abuna died; but though it was customary for the Abyssinian monarchs to advance the money necessary to bring a new one from Alexandria, Yafous found himself obliged to lay a tax upon the churches for defraying it at this time, having spent all his ready money in repairing and ornamenting his palaces. Three priests, consigned to the care of as many Mahometan factors, were sent to Egypt for the new patriarch; but they were detained for some time by the naybe or prince of Masuah, who extorted from them one half of the money given by the emperor for bringing the abuna from Cairo. Yafous no sooner heard that they were detained at Masuah, than he sent orders to Suhul Michael governor of Tigré to refuse provisions to the inhabitants of Masuah, which would soon reduce the naybe to obedience: but as Michael intended soon to quarrel with the king himself, he was not in any haste to obey the orders he received. The travellers were therefore detained so long, that on their arrival at Jidda, they found they had lost the monsoon; and, what was worse, the scheriff of Mecca would not allow them to pass without a fresh extortion. Their money was now exhausted; but the rapacious scheriff put one of their number in prison; where he continued for a twelvemonth till the money arrived: and from this time these extortions were changed into a stated tribute; 75 ounces of gold (about 186l. sterling) being granted for leave of passage to Cairo for the abuna; 90 ounces to the scheriff, and as many to the naybe, for allowing the abuna to pass from Cairo: an agreement which subsists to this day. Several other insults of this kind being received from the naybe, Yafous at last discovered that there was a strict alliance betwixt him, the governor of Tigré, and the Baharnagash; any one of whom, had he thought proper, could have crushed this pitiful prince with the smallest effort. On this the emperor determined to march against him in person; but was prevented by a rebellion which had been purposely excited in the country of Azab and that of the Dobas. The rebels were easily overthrown: and thus the expedition against the naybe was delayed for a year; during which interval the emperor sent for Michael to Gondar. This order was positively refused, and a war ensued. Michael, unable to contend with the emperor in the open field, took to a high mountain, the usual refuge of Abyssinian rebels. Here also his bad fortune pursued him; all his posts were taken by storm excepting one, which, it was evident, would likewise have been carried, though not without a very great expence of men. Here Michael requested a capitulation; and to ensure favourable terms, he desired to put into the hands of Yafous a great quantity of treasure, which would otherwise be dissipated among the common soldiers. This being done, Michael descended with a stone upon his head, as confessing himself guilty of a capital crime, with a design to make submission to the emperor. This was prevented for one day by a violent storm of wind and rain; from which moment the Abyssinians believe he

began converse with the devil: but Mr Bruce informs us, that he has often heard him say it was Michael the archangel who was his correspondent.

Abyssinia. Yafous is obliged to pardon him contrary to his own inclination.

Yafous was firmly determined to put this rebel to death, notwithstanding the quantity of gold he had received; nevertheless a promise was extorted from him that he would spare his life. As soon as Michael came into his presence, the emperor was filled with indignation, retracted his promise, and ordered him to be carried out and put to death before his tent door. The execution of the sentence, however, was prevented by the intercession of all the officers of any consideration in the court or army. Such universal sollicitation could not be withstood: Michael was pardoned; but with these remarkable words, that the emperor washed his hands of all the innocent blood which Michael should shed before he brought about the destruction of his country, which he knew he had been long meditating.

He is set at liberty and raised to the highest honours.

Michael continued for some time in prison; but was afterwards set at liberty, and even restored to his government of Tigré. No sooner was he reinstated in this dignity, than, collecting an army, he attacked Kafmatj Woldo governor of Amhara, defeated him in two battles, and forced him to take refuge among the Galla, whom he soon after bribed to murder him. In other respects he behaved as a most dutiful subject, gave the king the best intelligence, and supplied him with soldiers better accounted than he had ever before beheld. He was also more humble than before his misfortune; nor did an increase of his favour and influence make him deviate from the line he had prescribed. Having begun to gain friends by bribery, he continued to add one bribe to another to secure the old, and to gain new ones by the same means, pretending all the while to no kind of dignity or honour, not even to such as was justly due to his own rank. Thus he became such a favourite with the emperor, that he bestowed upon him the governments of Endereta and Siré, in addition to that of Tigré; so that he was now master of almost one half of Abyssinia. During the reign of Yafous, however, he attempted nothing. The foundations of the disturbances which succeeded were laid by the queen-mother, towards the end of the reign of Yafous. This emperor had been married when very young to a lady of Amhara, by whom he had two sons named Adigo and Aylo; but as his wife pretended to interfere in matters of state, he was persuaded by his mother to banish both her and her children to Wechné. After this his mother chose a wife for him from among the Galla; a people of all others the most obnoxious to the Abyssinians, both on account of the horrid barbarity of their manners, and the continual wars which from time immemorial had taken place between the two nations. The new queen was the daughter of one Amitzo, a prince who had once hospitably entertained Bacuffa before he became emperor; and his people were esteemed the least barbarous of the whole. A prejudice against her, however, against her offspring, and the emperor himself, never to be effaced, now took place among the Abyssinians; but this did not show itself during the reign of Yafous. The emperor died on the 21st of June 1753, being the 24th year of his reign, not without suspicion of being poisoned by his mother's relations, who were now attempting

Cause of the great civil war in Abyssinia.

Death of Yafous.

Abyssinia. tempting to engross the whole power of the empire into their hands.

Reign of Yoas. On the death of Yafous, his son Yoas by the Galla princess just mentioned succeeded to the throne without any opposition. The discontent which had taken place in the former reign about the power assumed by the relations of the old queen, now began to show itself more openly; and it was complained that a relationship to her was the only way to preferment, by which means the old families, whose merit had often saved the state, were totally excluded from every share of favour.

The Galla introduced into Abyssinia. On the accession of the young king, a party of Galla horse, said to be about 1200 in number, were sent as the portion of his mother; and these were quickly followed by a number of private persons from motives of curiosity, or hopes of preferment, who were embodied to the number of 600 into a troop of infantry, the command of which was given to Woolheka. The great favour in which these people were at court soon induced many others to make their appearance. Two of the king's uncles were sent for by his express desire; and they brought along with them a troop of 1000 horse. By the time they arrived the queen was dead; but her two brothers, named *Brulhe* and *Lubo*, finding that the king put an entire confidence in them, determined to make a party at court. This was easily effected; every thing was governed by Gallas; even the king himself affected to speak their language; while the Abyssinians were to the last degree mortified at seeing their inveterate enemies thus establishing a dominion over them in the heart of their own country. At last the king thought proper to appoint his uncle *Lubo* to the government of Amhara; but this produced such excessive discontent, that he was fain to retract his nomination, lest a civil war should have ensued. While the empire was thus divided into two parties, *Suhul Michael* came to Gondar in a very splendid manner, on an application from the exiled prince of Sennaar to be restored to his kingdom. When conducted into the presence of the emperor, he prostrated himself before him, owned himself his vassal, and was put in possession of the government of Ras el Feel upon the frontiers, with a large revenue, where he was advised to stay till the disputes which subsisted at that time should subside. This salutary advice, however, he had not prudence to comply with; but suffering himself to be decoyed from his asylum in Atbara, was taken prisoner and murdered.

King of Sennaar murdered. In the mean time, the Abyssinian prime minister, *Welled de l'Oul*, died. He had hitherto moderated the fury of the opposite parties by his wife and prudent conduct; but no sooner was he taken out of the way, than a most dreadful scene of confusion and civil war took place, which raged with the utmost violence while *Mr Bruce* was in Abyssinia, and seemed not likely to come to any termination when he left it. The whole empire was divided into two great factions: at the head of the one was the old queen, mother of Yafous; and at the head of the other, Yoas himself the emperor, with his Galla relations. Matters were first brought to a crisis by the imprudence of the emperor himself in bestowing the government of Begemder upon *Brulhe* one of his Galla uncles. The government of this province had been lately resigned into the hands of the queen by an old officer named *Ayo*; and it was suppo-

fed that his son named *Mariam Barea*, universally allowed to be one of the most accomplished noblemen of the kingdom, was to succeed him in this government. This opinion was farther confirmed by the marriage of *Mariam* herself with *Ozoro Esther*, a daughter of the old queen by her second husband. Unfortunately a quarrel had happened between *Kasmati Ayo*, the old governor of Begemder, and *Suhul Michael*, a little before the resignation of the former, and continued undecided till *Mariam* took the office upon him. The occasion was quite trifling; nevertheless, as *Mariam* had refused to submit to the decision of the judges, whom he stigmatized as partial and unjust, insisting that the king should either decide the affair in person, or that it should be referred to the decision of the sword, he thus fell under the imputation of being a disobedient and rebellious subject. In consequence of this, Yoas looked upon him ever afterwards with an evil eye; and now deprived him, by proclamation, of the government of Begemder, giving it to his own Galla uncle *Brulhe*, of whom we have already made so much mention. This unexpected promotion threw the whole empire into a ferment. As Begemder was a frontier province bordering on the country of the Galla, there was not the least doubt, that, immediately on the accession of *Brulhe* to his new office, it would be overrun by that race of barbarians, remarkable for their savage manners almost beyond all the other nations in Africa. This was the more dangerous as there was not above a day's journey betwixt the frontiers of Begemder and Gondar, the capital of the whole empire. *Mariam Barea* herself, who had a high sense of honour, was particularly hurt at the manner in which he was deprived of his dignity, and condemned with his family to be subject to a race of Pagans, whom he had often defeated in battle, and obliged to acknowledge him as their superior. All remonstrance, however, was vain. *Brulhe*, under the sanction of the imperial command, advanced with an army to take possession of his new dignity: but so exceedingly averse were the Abyssinians to follow him in this expedition, that the army disbanded itself several times after it had been collected; and it took up almost a year before he could proceed from the place where his camp was, at the lake *Tzana* or *Dembea*, to the frontiers of Begemder, though scarce a day's journey distant. *Mariam Barea* beheld his operations with great contempt, employing his time in the dispatch of ordinary business, and endeavouring to reconcile himself to the king, but without success. As his last effort, he sent a remonstrance to the emperor; in which, after many protestations of duty and obedience, he reminded him, that, at his investiture into the office of governor of Begemder, he had sworn not to allow any of the Galla to enter his province: that, should he deviate from the observance of this oath, the safety of the princes in *Wechnè* would be endangered; they would constantly be liable to the invasions of the Pagans, and probably be extirpated, as had already happened at two different times: and he begged of the emperor, if he was determined to deprive him of his government, to bestow it rather upon some Abyssinian nobleman; in which case he promised to retire, and live in private with his old father. He had, however, formed a resolution, which he thought it his duty to submit to the emperor, that if his ma-

Abyssinia. jesty should think proper to come, at the head of a Galla army, to invade his province, he would retire to the farthest extremity of it, till he was stopped by the country of the Galla themselves; and, so far from molesting the royal army, he might be assured, that though his own men might be straitened, every kind of provision should be left for his majesty. But if an army of Galla, commanded by one of that nation, should enter the province, he would fight them at the well of Fernay, on the frontiers, before one of them should drink there, or advance the length of a pike into the province.

This remonstrance had no effect upon the emperor. He returned a scoffing answer, announcing the speedy arrival of Brulhe, whom he thought sure of victory: but, at the same time, to show that he did not put his confidence entirely in his prowess, he created Suhul Michael governor of Samen, which lay next to Tigré in the way to Samen, so that no obstruction might lie in the way of that officer's march to Gondar, in case there should be any occasion for him. Mariam, provoked at the manner in which he was undervalued in the king's message, gave an ironical reply, in which he alluded to the name of *Brulhe*, in the Abyssinian language signifying a kind of *bottle*; this he told him would be broken on the rocks of Begemder, if sent into that country.

Brulhe defeated and killed. On receiving this last message from Mariam, the king instantly ordered the army to be put in motion; but the Abyssinians had unanimously determined not to act offensively against their countrymen. Brulhe therefore was left to decide the affair with his Galla. Mariam kept exactly to his word in the declaration he had made to the king, not stirring out of his province, nor allowing the least attempt to be made to harass his enemy, till they were drawn up at the well above mentioned, where he met them with his army. The Galla, unsupported by the Abyssinian troops, were utterly unable to bear the shock of Mariam's army, and therefore soon betook themselves to flight; but a part of them, who were surrounded by the cavalry, fought valiantly till they were all cut to pieces. Mariam had given the most express orders to take Brulhe alive; or, if that could not be done, to allow him to make his escape. One of his servants, however, observing him in the field, pushed up through the enemy to the place where he was, and running him twice through with a lance, left him dead on the spot.

Mariam Barea was no sooner informed of the death of his rival, than he cried out in great emotion, that Suhul Michael, with the whole army from Tigré, would attack him before autumn. In this he was not deceived. Ioas instantly dispatched an express for Michael, ordering his attendance, and investing him with the dignity of Ras, by which he became possessed of unlimited power both civil and military. Michael himself had for a long time seen that matters would come to this crisis at last, and had provided for it accordingly. He now set out with an army of 26,000 men, all of them the best soldiers in the empire, and 10,000 of them armed with muskets. As he passed along, his troops desolated the country wherever they came, but he encumbered his army by nothing useless; allowing his men to carry along with them neither women, tents, beasts of burden, nor even provisions.

The subsistence of his troops was abundantly provided for by the miserable inhabitants of the provinces through which he passed; and, not satisfied with this, he insisted on a contribution in money from all the districts within a day's march of those places where he was; the least delay was followed by the slaughter of the inhabitants and destruction of their houses. Towns, villages, and buildings of every kind, were set on fire as he passed along; the people fled from all quarters to the capital for refuge, as from the face of the most inveterate enemy; and Ioas himself was now sensible of his having been in the wrong to invest him with such unlimited power. On his arrival at the capital, Michael took possession of all the avenues, as if he meant to besiege it; so that an universal consternation ensued. Instead of offering any hostility, however, he waited with the utmost respect on the emperor, proceeding immediately from the royal presence to his own house, where he sat in judgment, as the nature of his office required him to do. No sooner had he taken upon him this new office, however, than he executed justice in such a rigorous and impartial manner as made the boldest offenders tremble. Some parties of his own soldiers, presuming upon the licence that had hitherto been granted them, entered Gondar and began to plunder as they had done in other places; but, on the very first complaint, their commander caused 12 of them to be apprehended and hanged. Their execution was followed by 50 others in different quarters of the city; after which he gave the charge of the capital to three officers who were to preside over three quarters, himself taking care of the fourth. Two civil judges were appointed to assist each officer in a district, two were left in the king's house, and four of them held a court of judicature in his own. Thus the inhabitants, finding, that instead of bloodshed and massacre, they were to expect nothing but strict equity and moderation, became reconciled to Michael the day after his arrival, and lamented only that he had not come sooner to relieve them from the anarchy and confusion in which they had been held so long. To so great a degree of perfection indeed did he bring his legislation, that a very short time after he entered the city, a loaf of bread, a bottle of water, and an ounce of gold, were exposed in the market-place on the head of a drum night and day for some time, without any one offering to take them away. This was the more remarkable as there was then a scarcity of provisions, and Michael himself would allow but a very scanty supply of water to be carried into the city; thereby giving the inhabitants to understand, that if he should set fire to it as he had done to other places, it would not be in their power to quench the flames.

The capital being thus secured in perfect obedience, Michael next prepared to set out on his expedition against Mariam Barea. Sensible, however, that the destruction of this worthy nobleman would be attended with a great degree of odium, he was resolved that none of it, or at least as little as possible, should fall upon himself. For this purpose, he insisted that the emperor should march in person from Gondar, and carry all his soldiers along with him. Thus he had an opportunity of throwing the whole blame upon Ioas, and representing himself as no more than a passive instrument in the affair. He also took every occasion of praising

Farther promotion of Michael.

Arrives at Gondar.

Executes justice impartially.

Michael created Ras.

Commits great devastations.

Marches against Mariam Barea.

Abyssinia. praising his antagonist for his virtues, and censuring the emperor for attempting to cut off such an excellent officer.

In the mean time Mariam Barea keeping exactly to the terms of the last remonstrance he had sent to Ioas, retired before him to the extremity of the province. Ioas and Michael advanced furiously, burning and destroying every thing as they went along. An engagement at last ensued at a place called *Nefas Musa*, on the extreme borders of Begemder, when Mariam could not retreat without going out of the province. As the royal army was more than twice the number of the other, and commanded by an officer of superior skill, victory was not long of being decided in its favour.

Mariam defeated.

Betrayed by the Galla, and cruelly murdered.

Mariam with 12 of his officers, took refuge in the country of the Galla; but were immediately delivered up by that faithless people. He was put to death by Lubo the brother of Brulhe, who is said with his own hands to have cut his throat as a sheep is commonly killed in this country, and afterwards to have disfigured the body in a shocking manner. The head was cut off, and carried to Michael's tent, who would not allow it to be uncovered in his presence. It was afterwards sent to the family of Brulhe in the country of the Galla, to show them what attention had been given to revenge his death; and this displeased the Abyssinians even more than any thing that had yet happened since the beginning of the contest.

Some of his officers protected by Michael.

The 12 officers, who were taken along with him, sought protection in the tent of Ras Michael, to which they were suffered to escape by Woosheka their keeper. Lubo, however, intended likewise to have sacrificed them as he had done Mariam, and therefore sent Woosheka to demand them: but no sooner had he unfolded his errand, than Michael in a rage, called to his attendants to cut him in pieces before the tent door; which would certainly have been done, had he not fled with the utmost precipitation.

Disagreement between the king and Michael.

The scandalous ascendancy which the Galla always manifested over the king, had greatly displeased Michael; who expressed himself so freely on the subject, that a coolness took place between them. Another officer named *Waragna Fasil*, a Galla by birth, had insinuated himself into the king's favour, and greatly distinguished himself at the battle of *Nefas Musa*. It was no wonder, therefore, that he soon became a rival to Michael; and this rivalry was greatly augmented by the following circumstance. Near the field of battle at *Nefas Musa* was a house of Mariam Barea, where Ozoro Esther his widow now was. Being surrounded by pleasant and verdant meadows, Fasil encamped there for the sake of his cavalry. No other design was at that time apparent; however, his presence greatly alarmed the princess. She had along with her at that time a nobleman named *Ayto Aylo*, who had been at the battle of *Scnaar*; but had there been terrified to such a degree, that he resolved to renounce the world ever after and turn monk. In this character he was now with Ozoro Esther; and though he refused to be concerned in any military affairs, he was still consulted by both parties as a kind of oracle. In the present emergency, therefore, he told the princess that there was only one way by which she could secure herself from the cruelty of the Galla, and becoming a prey to one or other of the murderers of

her husband; and that was by immediately espousing Abyssinia Ras Michael. Ozoro was perfectly sensible of the propriety of the advice, and therefore set out next morning in company with Aylo to Michael's tent. Here she threw herself at his feet on the ground; and refusing to rise, Aylo explained her errand, informing the Ras that she intended to bestow herself upon him in marriage, as being the only person not guilty of her former husband's death capable of affording her protection in her present situation. Michael saw clearly the advantages attending such a match; and therefore having caused the army to be drawn up in order of battle, as if for a review, he sent for a priest, and was married to the princess in the sight of all his men. The ceremony was followed by the loud acclamations of the whole army; and Ioas was soon informed of the reason. He expressed his displeasure at the match, however, in such unequivocal terms, that a mutual hatred from that moment commenced. This was soon made public by a very trifling accident. One day while the army was marching, Michael being much incommoded by the sun which affected his eyes, threw a white handkerchief over his head to keep off the heat. This was instantly told the king, who took it as an affront offered to himself; for in Abyssinia it is unlawful to cover the head on any occasion whatever in presence of the emperor, or even within sight of the palace where he lodges. Ioas was no sooner informed of the supposed affront, than he sent to the Ras to know upon what account he presumed to cover his head in his presence; but though the covering was instantly taken off, it was thought that no atonement could ever be made for such a grievous offence. Soon after this a quarrel happening between Fasil and a person named *Gufso*, likewise a man of great consequence, complaint was made to the Ras, who, as civil judge, summoned both parties before him. Fasil absolutely refused to obey any such jurisdiction; and the affair being laid before the other judges, it was given in favour of Michael, and Fasil declared to be in rebellion. This was followed by a proclamation depriving him of his government of *Damot*, and every other public office he held. Fasil, however, had no mind to submit to this disgrace; and therefore, after holding a long conference with the king, departed with his army, encamping on the high road betwixt *Damot* and *Gondar*, where he intercepted the provisions coming from the southward to the capital. This was followed by an attempt to assassinate the Ras. A shot was fired from one of the windows of the palace into the house where he sat in judgment; the distance being so small, that he could easily be seen from the palace while thus employed. The ball, however, missed Michael, but killed a dwarf who was standing before him fanning the flies from his face. As it was evident that this shot must have been fired with the knowledge of the king, it was rightly judged to be the commencement of hostilities. Ioas instantly removed to a distance, but sent Woosheka with orders to the Ras to return to *Tigré* without seeing his face; declaring, at the same time his own uncle Lubo governor of *Begemder* and *Amhara*. Michael could scarcely be prevailed upon to see Woosheka, and told him that he should certainly be put to death the next time he appeared in his presence. Next day Ioas sent a message to the Ras by four judges, commanding him to return to *Tigré* without

Final quarrel betwixt Michael and Fasil.

A shot fired at Michael from the palace window.

^{Abyssinia.} without the least delay, under pain of his highest displeasure. Michael returned a formal answer, concluding, that he expected the king himself to be ready to march against Fasil to-morrow. To this an absolute refusal was given; on which Michael issued a proclamation, commanding all the Galla to leave the capital next day under pain of death: in case of disobedience they were declared outlaws, and liable to be killed by the first that met them if they were found 24 hours after the proclamation in the capital, or to the same penalty if they were found in the kingdom after ten days. An engagement took place a short time after, in which Fasil was totally defeated, and obliged to retire into Damot. In this engagement some of the king's black horse were taken. These are all slaves, and subject to no other commands but those of his majesty himself. Their appearance clearly showed that they must have been sent by the king to fight against the Ras. All of them were therefore brought before the latter, and interrogated by whose orders they had come to the battle. Two refused to give any answer, and had their throats cut in presence of their companions. A third plainly told him that they had been sent by the king; who had likewise ordered an Armenian to fire out of the palace window at Ras Michael. On this the prisoners were dismissed; but assassins instantly dispatched to put an end to the king's life; which they accomplished, and buried him in a church dedicated to St Raphael.

Fasil defeated by Michael.

Ioas assassinated.

Hannes set up by Michael, and soon after poisoned.

On the death of Ioas, Michael, now absolute master of Abyssinia, set up for emperor Hannes, brother to the late king Bacuffa, an old man who had resided almost all his lifetime on the mountain of Wechnè, and being entirely unacquainted with the affairs of the world was on this account probably supposed by Michael to be the more proper for his purposes. Hannes had been maimed by the loss of his hand, on purpose to incapacitate him for the throne; but this objection was laughed at by the Ras. He found him, however, possessed of a quality much more inimical to his own purposes; and that was, an absolute aversion at meddling with the affairs of government: so that he could not by any means be induced to take the field against Fasil. Michael therefore was obliged to set out by himself; but thinking it improper to leave a king of any kind behind him in the capital, he had the old man poisoned before his departure; putting his son Tecla Haimanout in his place.

Reign of Tecla Haimanout.

The young emperor, according to Mr Bruce's account, was of a fair complexion, less tawny than a Neapolitan or Portuguese, owing to his having been born in the mountain. He was endowed with many princely accomplishments; and so much attached to Michael Ras, that he called him *Father* from the time of his accession, waiting upon him when indisposed with the affection of a son. There being now no objection therefore, Michael marched against Fasil without delay, and entirely defeated him on the 3d of December 1769. On this occasion Woosheka was taken prisoner, and afterwards fled alive, notwithstanding the intercession of some of Michael's officers for him; his skin being afterwards formed into a bottle. This piece of cruelty was attributed to Ozoro Esther; whom Mr Bruce represents as the most humane and merciful of women; though he is obliged to allow, that on the present occasion, as well as on every other which re-

Fasil defeated.

garded her former husband, she entirely forgot her character. The night on which this miserable victim was destroyed, she appeared in the king's tent dressed like a bride; and in a little time returned in triumph to Gondar.

^{Abyssinia.}

Soon after these transactions, Mr Bruce entered Abyssinia. He arrived at Masuah when there was only a report of Hannes's being ill, and Mr Bruce was supposed to be his physician, though in truth that emperor was already dead. Here he was ill-treated by the naybe, with a design to extort money, and afterwards probably to put him to death, as was his custom with other strangers. He escaped the danger, however, by the protection of Achmet, nephew and heir apparent to the naybe; and by his own prudent and resolute behaviour, threatening his adversaries with the arrival of a British man of war in case of any injury; showing the Grand Signior's protection; making use of the name of Ras Michael, now so formidable, and to whom he had obtained a recommendation, &c. After many vexations and delays, he was at last allowed to depart; and a guide, by name *Saloome*, was sent along with him. This man was brother-in-law to the naybe, and a professed Christian; but a traitor in his heart, and who wished to do every thing in his power to hurt our traveller. He was furnished with another guide, however, by his friend Achmet, to inform him where to pitch his tent, and other necessary particulars.

^{Mr Bruce's arrival and adventures in Abyssinia.}

On the 15th of November 1769 Mr Bruce left Ar-keeko, and the eastern coast of Africa, and proceeded southwards for Gondar the capital of Abyssinia. After an hour's journey, he pitched his tent near a pit full of rain water, where he remained all day; and in the evening a messenger arrived from the naybe, who took away the guide *Saloome*. Next day the latter returned in company with Achmet the naybe's nephew, already mentioned. The latter caused him deposite in his hands *Saloome's* full hire, as though he had gone the whole length he had promised. Four of the men were commanded to go back to Ar-keeko, and others put in their place: after which Achmet told Mr Bruce, that he was not to take the road through Dobarwa, though near, because it belonged to the naybe; but that *Saloome* knew another by a place called *Dixan*, which belonged to himself, and where he could ensure him of a good reception. In this journey he told him that he would be obliged to cross the mountain of Taranta, the highest in Abyssinia; but the fatigue of this would be more than recompensed by the assurance of safety and the curiosity of the place. Taking leave of Achmet in a very friendly manner, therefore, Mr Bruce with his company finally set out on their journey the evening of the 16th. For the short space they had travelled, the ground was covered with grass broader in the leaf than ours; but in a little time the soil became hard, dry, gravelly, and full of acacia or Egyptian thorn. Next day (the 17th) they changed their course from south to west; and soon arrived at a range of mountains standing so close to one another, that there was no passage between them excepting what was worn by torrents of water; the bed of one of which consequently now became their road. In the evening they pitched their tent at some distance from this torrent, which had scarcely any water in it when they left it; but all the afternoon there had been an appearance of rain, with much

^{Sets out from Ar-keeko.}

^{Account of the country through which he passed.}

Abyssinia. much thunder and lightning, at a distance. On a sudden they heard a noise among the mountains louder than thunder; and instantly saw the torrent, swelled immensely by the distant rains, now running like a rapid river, and the foremost part of it advancing in its bed in a body of water about the height of a man. Having run for some time in this violent manner, the current, no longer supplied by the rains, began to diminish, and by the next morning was quite gone. Among these mountains the nights are cold even in summer.

Sudden swell of a torrent.

Notes of the African birds different from those of Europe.

Account of the mountain Taranta.

On the 18th the journey was resumed in the bed of the torrent, which now scarcely had any water: though the stones were rendered very slippery by the quantity of rain which had fallen. Leaving this disagreeable road, they came to a fine rivulet; which being the first clear water they had seen from the time Mr Bruce left Syria, was exceedingly agreeable. They proceeded along the banks of this river for some time; and soon after leaving it, they came to another of the same kind: but next day were obliged to resume their course in the bed of a torrent. The mountains in this part of the world are excessively rugged and full of precipices, entirely destitute of soil, and covered with loose stones of a black colour. On the side of the torrent in which they marched, however, there grew very large fycamore trees, some of them little less than 7½ feet in diameter. Their branches afforded shelter to an infinite number of birds; many of them without song; but others having notes very different from the European kinds, and peculiar to the continent of Africa. Most of those which had very beautiful colours were of the jay or magpie kind. The trees were loaded with figs; but they came to nothing, by reason of the ignorance of the savages, who knew not the process of caprification. The streams of water themselves, which at this season were found so delightful, run only after October: they appear on the other side of the mountains when the summer rains in Abyssinia are ceasing; at other times, no water is to be met with, excepting what is contained in stagnant pools.

On the 20th of November they began to ascend the high mountain of Taranta. Their road was now excessively rugged and uneven, intersected with monstrous gullies and holes made by the torrents, as well as by huge fragments of rocks which had tumbled down. It was with the utmost difficulty that they could carry the astronomical instruments up the hill; in which work Mr Bruce himself, and one of his attendants named *Yasine*, a Moor, bore a principal share. The only misfortune they met with was, that their asses being unloaded, and committed to the care of a single person, refused to ascend this barren mountain; and in spite of all that their driver could do, set off at a brisk trot for the fertile plains below. Luckily, however, they were afterwards recovered by four Moors sent after them, and the journey resumed without any material interruption. The beasts were now become much more tractable, having been seen and pursued by the hyænas with which that mountain abounds.

Taranta is so destitute of earth, that there was no possibility of pitching a tent upon it; so that our travellers were obliged to take up their lodging in one of the caves with which it abounds. The under part of

the mountain produces in great plenty the tree called *kolquall*, which was here observed in greater perfection than in any other place throughout the whole journey. The middle part produced olives which carried no fruit; and the upper part was covered with the oxycedras or Virginia cedar, called *arze* in the language of the country. On the top is a small village named *Halai*, inhabited by poor shepherds, who keep the flocks of the rich people of the town of Dixan below. They are of dark complexion, inclining to yellow; their hair black, and curled artificially by means of a stick, and which our author supposes to be the same with the *crisping-pin* mentioned, IIa. iii. 22. The men have a girdle of coarse cotton cloth, swathed six times round their middle; and they carry along with them two lances, and a shield made of bulls hides. Besides these weapons, they have in their girdles a crooked knife with a blade about 16 inches in length, and three in breadth at the lower part. There is here great plenty of cattle of all kinds; the cows generally of a milk white, with dewlaps hanging down to their knees; their horns wide like those of the Lincolnshire cattle; and their hair like silk. The sheep are all black both here and throughout the province of Tigré; having hair upon them instead of wool, like the rest of the sheep within the tropics; but remarkable for its lustre and softness, without any bristly quality. On the top of the mountain is a plain, which, at the time our author was there, they had sown with wheat. The air seemed excessively cold, though the barometer was not below 59° in the evening. On the west side the cedars, which on other parts are very beautiful, degenerate into small shrubs and bushes.

Abyssinia. Of the village Halai, and inhabitants of the mountains.

Beautiful cattle, &c.

The road down this mountain was for some time nothing inferior in ruggedness to what they had met with in ascending it; but as they approached Dixan, it became considerably better. This is the first town on the Abyssinian side of Taranta. It is seated on the top of a hill of a form exactly conical, surrounded by a deep valley like a ditch; and no access to it but by a path which winds round the hill. The inhabitants were formerly exterminated by Michael Ras; and the succeeding race, in Mr Bruce's time, were of a very indifferent character, being, as he says, composed of the worst people from the territories of the Baharnagash and the province of Tigré, on both of which it borders. Here he was in danger from the treachery of Saloome, who wished to have decoyed him into the power of some assassins. Finding that this could not be done, he surrounded Mr Bruce and his retinue with a body of armed men; but they were dispersed by the authority of Hagi Abdelcarder, the friend of Achmet, who had received orders to provide for the safety of the travellers. The only trade carried on here is that of buying and selling slaves; who are stolen from Abyssinia, chiefly by the priests, and sent into Arabia and India.

Town of Dixan described.

The next stage was from Dixan to Adowa, capital of the province of Tigré. Leaving Dixan on the 25th of November, they pitched their tent the first night under a large spreading tree called *daroo*, which Mr Bruce says was one of the finest he saw in Abyssinia, being about 7½ feet in diameter. They had been joined by some Moors driving 20 loaded asses and two bulls, which in that country are likewise used as beasts of burden.

Journey to Adowa, the capital of Tigré.

Abyssinia. burden. Here, our author says, he recovered a tranquillity of mind which he had not enjoyed since his arrival at Mafuah; but they were now entirely without the dominions of the naybe, and entered into those of the emperor. Saloom attended them for some way, and seemed disposed to proceed; but one of the company, who belonged to the Abyssinian monarch, having made a mark in the ground with his knife, told him, that if he proceeded one step beyond that, he would bind him hand and foot, and leave him to be devoured by wild beasts.

His treacherous guide obliged to return.

The country becomes more fertile as he passes along.

Being now in a great measure delivered from their fears and embarrassments, the company proceeded on their journey with pleasure, through a much better country than they had hitherto passed. In some places it was covered with wild oats, wood, high bent grass, &c. but, in not a few places, rocky and uneven. Great flocks of a bird as large as a turkey, called, in the Amharic language, *erkoom*, were seen in some places. A large animal of the goat kind, called *agazan*, was found dead and newly killed by a lion. It was about the size of a large ass, and afforded a plentiful repast. Numbers of kolquall trees were also seen; and the sides of the river Habesh were adorned with a beautiful tree of the same name with the stream. There were in this place also many flowers of various kinds, particularly jessamine. The mountains of Adowa, which they came in sight of on the 5th of December, are totally unlike any thing to be met with in Europe; their sides being all perpendicular rocks, like steeples or obelisks of many different forms.

Adowa described.

Adowa, though the capital of an extensive province or kingdom, does not contain above 300 houses; but occupies nevertheless a large space, by reason of the inclosures of a tree called *wansey*, which surrounds each of the houses. It stands on the declivity of a hill, situated on the west side of a small plain surrounded by mountains. It is watered by three rivulets which never become dry even in the greatest heats. A manufacture is carried on here of a kind of coarse cotton cloth, which passes for money throughout all Abyssinia. The houses are built of rough stone cemented with mud; lime being only used in the construction of those at Gondar, and even there it is very bad.

Visits the ruins of Axum.

Our traveller was very hospitably entertained at Adowa by one Janni, with whom he resided during his stay there. Leaving it on the 17th of December, he visited the ruins of Axum, once the capital of the empire. Here are 40 obelisks, but without any hieroglyphics. A large one still remains, but the two largest are fallen. There is also a curious obelisk, of which he gives a figure, with other antiquities which our limits will not allow us to enlarge upon. The town has at present about 600 houses, and carries on manufactures of the coarse cotton cloth already mentioned. It is watered by a small stream which flows all the year, and it is received into a fine basin 150 feet square, where it is collected for the use of the neighbouring gardens. Its latitude was found by Mr Bruce to be $14^{\circ} 6' 36''$ north.

On the 20th of January 1770, our traveller set out from Axum. The road was at first smooth and pleasant, but afterwards very difficult; being composed of stones raised one above another, the remains of a magnificent causeway, as he conjectures. As they pas-

fed farther on, however, the air was everywhere perfumed by a vast number of flowers of different kinds, particularly jessamine. One species of this, named *agam*, was found in such plenty, that almost all the adjacent hills were covered by it; the whole country had the most beautiful appearance; the weather was exquisitely fine, and the temperature of the air agreeable. In this fine country, however, Mr Bruce had the first opportunity of beholding the horrible barbarity of the Abyssinians in cutting off pieces of flesh from the bodies of living animals, and devouring them raw; but notwithstanding this extreme cruelty, they have the utmost horror and religious aversion at pork of every kind; insomuch that Mr Bruce durst not venture to taste the flesh of a wild boar, just after having assisted in the destruction of five or six.

Monstrous barbarity of the Abyssinians.

During the remaining part of the journey from Adowa to Sirè, the country continued equally beautiful, and the variety of flowers and trees greatly augmented; but as a report was propagated that Ras Michael had been defeated by Fasil, they now met with some insults. These, however, were but trifling; and on the 22d in the evening they arrived safely at Sirè, situated in N. Lat. $14^{\circ} 4' 35''$.

This town is still larger than Axum: but the houses are built of no better materials than clay, and covered with thatch; the roofs being in the form of cones, which indeed is the shape of all those in Abyssinia.

It stands on the brink of a very steep and narrow valley, through which the road is almost impassable. It is famous for a manufacture of cotton cloth, which, as we have already observed, passes for money throughout the whole empire. At some times, however, beads, needles, antimony, and incense, will pass in the same way. The country in the neighbourhood is extremely fine; but the inhabitants subject, by reason of the low situation, to putrid fevers. On leaving it on the 24th, our travellers passed through a vast plain, where they could discern no hills as far as the eye could reach, excepting some few detached ones standing on the plain, covered with high grass, which the inhabitants were then burning. The country to the northward is flat and open. In the way to Gondar, however, lies that ridge of mountains called *Samen*; of which one named *Lamalmun* is the most remarkable, and by some supposed to be the highest in Abyssinia. Betwixt Sirè and these mountains the river Tacazze runs, which, next to the Nile, is the largest in Abyssinia. Mr Bruce informs us that it carries near one third of the water which falls on the whole empire; and when passing it, he saw the marks of its stream, the preceding year, 18 feet perpendicular above the bottom; nor could it be ascertained whether this was the highest point to which it had reached. It has its source in the district of Angot, rising from three sources like the Nile, in a flat country, about 200 miles to the S. E. of Gondar. It is extremely pleasant; being shaded with fine lofty trees, the water extremely clear, and the banks adorned with the most fragrant flowers. At the ford where they crossed, this river was fully 200 yards broad, and about three feet deep; running very swiftly over a bottom of pebbles. At the very edge of the water the banks were covered with tamarisks, behind which grew tall and stately trees, that never lose their leaves. It abounds with fish, and is inhabited by crocodiles and hippopotami;

Tacazze river described.

^{Abyssinia.} hippopotami; the former of which frequently carry off people who attempt to cross the river upon blown-up skins. The neighbouring woods are full of lions and hyænas. The Tacazze is marked by Mr Bruce in his map as a branch of the Aftaboras, which falls into the Nile. The latitude of the ford was found to be $13^{\circ} 42' 45''$.

Mountainous country of Samen described.

This river was passed on the 26th of January; after which our travellers entered into the country of Samen; the governor of which, Ayto Tesfos, had never acknowledged the authority of Ras Michael, nor any of the emperors set up by him since the death of Ioas. The country therefore was hostile; but the uncertainty of the event of the war, and the well-known severity of Michael's disposition, preserved our traveller and his company from any insult, excepting a feeble and unsuccessful attempt to extort money. Here Mr Bruce observes that the people were more flat-nosed than any he had hitherto seen in Abyssinia. The path among the mountains was for the most part exceedingly dangerous, having a precipice of vast height close by it which way soever you turn. The mountains appeared of very extraordinary shapes; some being like cones; others high and pointed like columns, pyramids, or obelisks. In one place a village was observed in such a dangerous situation, that scarce the distance of a yard intervened between the houses and a dreadful precipice. Below it is a plain of about a mile square, covered with citron and lemon trees. A river named *Mai-Lumi* rises above this village, and falls into the wood, where it divides in two; one branch surrounding the north and the other the south part of the plains; then falling down a rock on each side, they unite; and having run about a quarter of a mile farther, the stream is precipitated in a cataract 150 feet high. The lions and hyænas were very numerous among these mountains, and devoured one of the best mules our travellers had. The hyænas were so bold, that they stalked about as familiarly as dogs, and were not intimidated by the discharge of fire arms. Their voracity was such, that they ate the bodies of those of their own species which our travellers had killed in their own defence.

Extreme voracity of the hyænas.

Lamalmon mountain described.

On the 7th of February they began to ascend Lamalmon by a winding path scarcely two feet broad, on the brink of a dreadful precipice, and frequently intersected by the beds of torrents, which produced vast irregular chasms in it. After an ascent of two hours, attended with incredible toil, up this narrow path, they came to a small plain named *Kedus* or *St Michael*, from a church of that name situated there. This plain is situated at the foot of a steep cliff, terminating the western side of the mountain, which is as perpendicular as a wall, with a few trees on the top. Two streams of water fall down this cliff into a wood at the bottom; and as they continue all the year round, the plain is thus preserved in continual verdure. The air is extremely wholesome and pleasant. On ascending to the very top of the mountain, where they arrived on the 9th of February, our travellers were surprised to find, that though from below it had the appearance of being sharp pointed, it was in reality, a large plain, full of springs, which are the sources of most rivers in this part of Abyssinia. These springs boil out of the earth, sending forth such quantities of water as are sufficient to turn a mill. A perpetual verdure prevails;

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and it is entirely owing to indolence in the husband-^{Abyssinia.} man if he has not three harvests annually. Lamalmon stands on the north-west part of the mountains of Samen; but though higher than the mountains of Tigré, our author is of opinion that it is considerably inferior to those which are situated on the south-east. The plain on the top is altogether impregnable to an army, both by reason of its situation and the plenty of provisions it affords for the maintenance of its inhabitants; even the streams on the top are full of fish. Here the mercury in the barometer stood at $20\frac{7}{8}$ inches.

During the time our travellers remained at Lamalmon, a servant of Ras Michael arrived to conduct ^{Journey to Gondar.} them safely to the capital, bringing a certain account of the victory over Fasil: so that now the difficulties and dangers of their journey were over. The country appeared better cultivated as they approached the capital; and they saw several plantations of sugar canes which there grow from the seed. In some places, however, particularly in Woggora, great damage is done by swarms of ants, rats, and mice, which destroy the fruits of the earth. Mr Bruce had already experienced the mischief arising from a small species of ^{Mischief done by ants.} ant, whose bite was not only more painful than the sting of a scorpion, but which issued out of the ground in such numbers as to cut in pieces the carpets and every thing made of soft materials to which they could have access.

When Mr Bruce approached the capital, he was dressed like a Moor: and this dress he was advised to keep ^{Arrival at Gondar.} until he should receive some protection from government; his greatest, indeed his only, danger arising from the priests, who were alarmed at hearing of the approach of a Frank to the capital. This was the more necessary, as the emperor and Michael Ras were both out of town. For this reason also he took up his residence in the Moorish town at Gondar; which is very large, containing not fewer than 3000 houses. The only inconvenience he underwent here was the not being allowed to eat any flesh: for we have already taken notice of a law made by one of the emperors, that none of his subjects should eat flesh but such as had been killed by Christians; and a deviation from this would have been accounted equal to a renunciation of Christianity itself. Here he remained till the 15th of February; when Ayto Aylo waited upon him, and addressed him in the character of physician, which he had assumed. By this nobleman he was carried to the ^{Mr Bruce introduced to the queen.} palace of Kofcam, and introduced to the old queen. His advice was required for one of the royal family who was ill of the small-pox; but a faint had already undertaken his cure. The event, however, proved unfortunate; the patient died, and the faint lost his reputation. Our limits will not allow us to give any particular account of the steps by which Mr Bruce arrived at the high degree of reputation which he enjoyed in Abyssinia. In general his success in the practice of medicine, his skill in horsemanship and the use of fire-arms, which by his own account must be very extraordinary; his prudence in evading religious disputes; as well as his personal intrepidity and presence of mind, which never once failed him, even in the greatest emergencies; all conspired to render him agreeable to ^{Is promoted and held in great estimation.} people of every denomination. By the king he was promoted to the government of Ras-el-Feel, was his great constant

Abyssinia. constant attendant on all occasions, and was with him in several military expeditions; but never met with any opportunity of distinguishing his personal valour, though he had the command of a body of horse at one of the battles fought at a place named *Serbruxos*. Thus honoured and employed, he had an ample opportunity of exploring the sources and cataracts of the Nile, as well as the geography and natural products of the whole country; obtaining also leave at last to return home. We cannot, however, praise the benevolence of his spirit at his departure. It has already been observed, that he was in some danger from the priests on his first arrival, on account of their suspecting him to be a Jesuit; for that is the meaning which they affix to the word *Frank* or *European*. As he constantly attended the established worship of the country, however, and carefully avoided all disputes on the subject of religion, he became at last not only unsuspected, but very intimate with many of the principal ecclesiastics. From one of these named *Tensa Christos*, he asked a benediction immediately before he departed; which piece of unexpected humility so affected the priest, that it brought tears in his eyes. The benediction was conveyed in the simple form, "God bless you." A troop of inferior priests who attended would needs bless him also; and probably were pleased at having it in their power to bestow a benediction publicly on a man of such consequence: but to the blessings of these poor monks Mr Bruce replied in *English*, "Lord send you all a halter, as he did Abba Salama!" This Abba Salama had been an ecclesiastic of great consequence; but of a very dissolute life, and at last hanged for his crimes. The monks imagined he had been recommending them to their patriarch Abba Salama, and with great devotion answered "Amen."

His departure from the country.

Event of the war before he left the country.

The history of the war after Mr Bruce's arrival is related at great length in his work. The king Tecla Haimanout still kept his ground, and was at last acknowledged by almost the whole empire, though success did not always attend his arms. An usurper, named *Socinius*, was reduced and made a servant in the king's kitchen; but was afterwards hanged for theft. Ras Michael, notwithstanding all his skill in military affairs, was not able to get the better of Fasil; and his excessive cruelty, avarice, and ambition, disgusted every one. An attempt was even made to assassinate him; and his spiritual friend (Michael the archangel, according to his own report, or the devil, according to that of the Abyssinians) at last forsook him; so that he was carried off prisoner by a party of the rebels. After this misfortune he was much dejected, imputing it to the want of the spiritual assistance just mentioned, and which it seems had withdrawn itself some time before. His wife Ozoro Esther, whom Mr Bruce characterizes as the handsomest woman he ever saw, was in great favour with the king at the time our traveller left Abyssinia. As the king himself was a handsome young man, there is no improbability in supposing with Mr Bruce, that "they were not insensible to each other's merits;" and as she was sometimes honoured with a *private audience*, where Michael himself "bore no part in the conversation," we shall conclude our history of this singular empire by a conjecture, that soon after Mr Bruce's departure, Michael either died by course of nature, he being then very old, or was cut

off by his enemies; on which Tecla Haimanout, having fully settled the affairs of his empire, became possessed of the beautiful Ozoro Esther, and commenced his reign with great glory. **Abyssinia.**

With regard to the geographical description of ancient Ethiopia, little can be said; as not even the boundaries of the empire itself, much less those of the particular districts which composed it, were known. The ancient writers, however, agreed that it was very mountainous: but they mention no mountains of any consequence excepting Garbata and Elephas, whose situation is not well ascertained, though it is generally supposed that they answer to the mountains of Tigré. The most noted cities were Axum, Napata, Premis, or Premnis, Melis, Mondus, Abalis, Mofylon, Caloe, Opono, &c. **Geography of ancient Ethiopia.**

The nations which inhabited ancient Ethiopia have already been enumerated; and it is not to be supposed that all, or indeed any two of them, would agree in many respects. The ancient historians, however, give the following information. They had many laws which were very different from those of other nations; especially their laws relating to the election of kings. The priests chose the most reputable men of their body, and drew a large circle around them, which they were not to pass. A priest entered the circle, running and jumping like an *Egipan* or a satyr. He of those that were enclosed in the circle who first caught hold of the priest, was immediately declared king; and all the people paid him homage, as a person intrusted with the government of the nation by Divine Providence. The new-elected king immediately began to live in the manner which was prescribed to him by the laws. In all things he exactly followed the customs of the country; he paid a most rigid attention to the rules established from the origin of the nation, in dispensing rewards and punishments. The king could not order a subject to be put to death, though he had been capitally convicted in a court of justice; but he sent an officer to him, who showed him the signal of death. The criminal then shut himself up in his house, and was his own executioner. It was not permitted him to fly to a neighbouring country, and substitute banishment for death; a relaxation of the rigour of the law, with which criminals were indulged in Greece. **Customs of the inhabitants. Diod. Sic. p. 101, 102.**

We have the following extraordinary information with regard to the death of many of their kings: The priests of Meroë, who had acquired great power there, when they thought proper dispatched a courier to the king to order him to die. The courier was commissioned to tell him, that it was the will of the gods, and that it would be the most heinous of crimes to oppose an order which came from *them*. Their first kings obeyed these groundless despotical sentences, though they were only constrained to such obedience by their own superstition. Ergamenes, who reigned in the time of Ptolemy the second, and who was instructed in the philosophy of the Greeks, was the first who had the courage to shake off this iniquitous and sacerdotal yoke. He led an army against Meroë, where, in more ancient times, was the Ethiopian temple of gold; when he put all the priests to the sword, and instituted a new worship.

The friends of the king had imposed on themselves a very singular law, which was in force in the time of Diodorus Siculus. When their sovereign had lost the

use

Abyssinia. use of any part of his body, by malady, or by any other accident, they inflicted the same infirmity on themselves; deeming it, for instance, shameful to walk straight after a lame king. They thought it absurd not to share with him corporal inconveniences; since we are bound by the ties of mere friendship to participate the misfortunes and prosperity of our friends. It was even customary among them to die with their kings, which they thought a glorious testimony of their constant loyalty. Hence the subjects of an Ethiopian king were very attentive to *his* and their common preservation; and therefore it was extremely difficult and dangerous to form a conspiracy against him.

The Ethiopians had very particular ceremonies in their funerals. According to Ctesias, after having salted the bodies, they put them into a hollow statue of gold which resembled the deceased; and that statue was placed in a niche on a pillar which they set up for that purpose. But it was only the remains of the richest Ethiopians that were thus honoured. The bodies of the next class were contained in silver statues; the poor were enshrined in statues of earthen ware.

Herodotus * informs us, that the nearest relations of the dead kept the body a year in their houses, and offered sacrifices and first fruits during that time to their deceased friend; and at the end of the year, they fixed the niche in a place set apart for the purpose near their town.

The Ethiopians made use of bows and arrows, darts, lances, and several other weapons, in their wars, which they managed with great strength and dexterity. Circumcision was a rite observed amongst them, as well as among the Egyptians, from very early antiquity; though which of these nations first received it, cannot certainly be known. The Ethiopian soldiers tied their arrows round their heads, the feathered part of which touched their foreheads, temples, &c. and the other projected out like so many rays, which formed a kind of crown. These arrows were extremely short, pointed with sharp stones instead of iron, and dipped in the *virus* of serpents, or some other lethiferous poison, inasmuch that all the wounds given by them were attended with immediate death. The bows from which they shot these arrows were four cubits long; and required so much strength to manage them, that no other nation could make use of them. The Ethiopians retreated fighting, in the same manner as the Parthians; discharging volleys of arrows with such dexterity and address, whilst they were retiring full speed, that they terribly galled the enemy. Their lances or darts were of an immense size, which may be deemed a farther proof of their vast bodily strength.

Thus far chiefly with regard to the Ethiopians who lived in the capital, and who inhabited the island of Meroë and that part of Ethiopia which was adjacent to Egypt.

There were many other Ethiopian nations, some of which cultivated the tracts on each side of the Nile, and the islands in the middle of it; others inhabited the provinces bordering on Arabia; and others lived more towards the centre of Africa. All these people, and among the rest those who were born on the banks of the river, had flat noses, black skins, and woolly hair. They had a very savage and ferocious appearance; they were more brutal in their customs than in

their nature. They were of a dry austere temperament; *Abyssinia.* their nails in length resembled claws: they were ignorant of the arts which polish the mind: their language was hardly articulate; their voices were shrill and piercing. As they did not endeavour to render life more commodious and agreeable, their manners and customs were very different from those of other nations. When they went to battle, some were armed with bucklers of ox hides, with little javelins in their hands; others carried crooked darts; others used the bow; and others fought with clubs. They took their wives with them to war, whom they obliged to enter upon military service at a certain age. The women wore rings of copper at their lips.

Some of these people went without clothing. Sometimes they threw about them what they happened to find, to shelter themselves from the burning rays of the sun. With regard to their food, some lived upon a certain fruit, which grew spontaneously in marshy places; some ate the tenderest shoots of trees, which were defended by the large branches from the heat of the sun; and others sowed Indian corn and lotos. Some of them lived only on the roots of reeds. Many spent a great part of their time in shooting birds; and as they were excellent archers, their bows supplied them with plenty. But the greater part of this people were sustained by the flesh of their flocks.

The people who inhabited the country above Meroë made remarkable distinctions among their gods. Some, they said, were of an eternal and incorruptible nature, as the sun, the moon, and the universe; others having been born among men, had acquired divine honours by their virtue, and by the good which they had done to mankind. They worshipped Isis, Pan, and particularly Jupiter and Hercules, from whom they supposed they had received most benefits. But some Ethiopians believed that there were no gods; and when the sun rose, they fled into their marshes, execrating him as their cruellest enemy.

These Ethiopians differed likewise from other nations in the honours which they paid to their dead. Some threw their bodies into the river, thinking that the most honourable sepulchre. Others kept them in their houses in niches: thinking that their children would be stimulated to virtuous deeds by the sight of their ancestors; and that grown people, by the same objects, would retain their parents in their memory. Others put their dead bodies into coffins of earthen ware, and buried them near their temples. To swear with the hand laid upon a corpse, was their most sacred and inviolable oath.

The savage Ethiopians of some districts gave their crown to him who of all their nation was best made. Their reason for that preference was, that the two first gifts of heaven were monarchy and a fine person. In other territories, they conferred the sovereignty on the most vigilant shepherd; for he, they alleged, would be the most careful guardian of his subjects. Others chose the richest man for their king; for he, they thought, would have it most in his power to do good to his subjects. Others, again, chose the strongest; esteeming those most worthy of the first dignity who were ablest to defend them in battle.

The Jesuit missionaries were the first who gave any Account information to the Europeans concerning this country; of the missionaries, and

* Lib. iii.
c. 24.

Diad. Sic.
p. 102

Abyssinia. and indeed, excepting them and the late accounts by Mr Bruce, we have no other source of information concerning it. Louis XIV. of France appointed six Jesuits to this mission, and furnished them with suitable presents for the emperor and the principal nobility. The admission of these missionaries was facilitated by a dangerous scorbutic disorder, which had attacked Yafous and his son, and for which they wished to have the advice of an European physician. Maillet, the French consul at Cairo, wishing the Jesuits to have the honour of the mission, disappointed the views of Friars Paschal and Anthony, two Franciscans, who were first thought of, and recommended Charles Poncet, a Frenchman, who had been bred a chemist and apothecary, and Father Brevedent as his servant, to Hagi Ali, a Mahometan factor at Cairo, for the desired purpose. The Franciscans attempted the destruction of Poncet and his attendants; but Poncet arrived safe at Gondar on the 21st of July, 1699, and having perfectly cured his royal patient, set out on the 2d of May, 1700, on his return for Europe, and arrived in safety at Masuah. Brevedent died at Gondar soon after their arrival. An embassy on the part of the Abyssinian monarch was defeated by the interference of Maillet; but the Jesuits concerted another mission from France, and the person appointed as ambassador was M. de Roule, vice-consul at Damietta. This mission was very improperly conducted; the merchants at Cairo opposed it; the Franciscans obstructed it, and it terminated in the murder of the ambassador in the province of Sennaar.

The missionaries confirm what is said by the ancients, that Abyssinia is a very mountainous country. The provinces of Begemder, Gojam, Waleka, Shoa, &c. according to them, are only one continued chain of mountains. Many of them were said to be of such enormous height, that the Alps and Pyrenees are but mole-hills in comparison of them. Those called *Aorni* were said to be of this kind; but Mr Bruce informs us, that these accounts are greatly exaggerated. Amongst those mountains, and even frequently in the plains, there are many steep and craggy rocks to be met with of various and whimsical shapes; some of them so smooth, that men and oxen are raised to the top by means of engines. The tops of these rocks are covered with woods and meadows, full of springs and streams of water; of which Mr Bruce has given us an account in his description of Lamalmon. The most remarkable of these, according to the authors we are now speaking of, is that called *Amba Gesben*, mentioned in the course of this article as one of the mountains used for a prison to the princes of the blood. Its top is described as only half a league in breadth, though it is said that it would require near half a day to go round it.

Mr Bruce's account of its divisions.

Modern Ethiopia, or *Abyssinia*, as it is now called, is divided, according to Mr Bruce, into two parts, named *Tigré* and *Ambara*; though this rather denotes a difference in the language than the territory of the people. The most easterly province properly so called is Masuah. It is of considerable length, but no great breadth; running parallel to the Indian ocean and Red sea, in a zone of about 40 miles broad, as far as the island MASUAH. The territories of the Baharnagash include this province as well as the districts of Azab and Habab. In the former are mines of fossil salt, which substance in Abyssinia passes current instead of

money. For this purpose the mineral is cut into square solid pieces about a foot in length. Here also is a kind of mint from which great profits are derived. The Habab is likewise called the land of the *Agazsi* or Shepherds; who speak the language called *Geez*, and have had the use of letters from the most early ages. This province was formerly taken by the Turks, when the rebellious Baharnagash Isaac called them to his assistance against the emperor Menas. From that time the office fell into disrepute, and the Baharnagash at present has much less power than formerly. The province of Masuah is now governed by a Mahometan prince or officer called a *nybe*.

Tigré is bounded on the east by the territories of the Baharnagash, of which the river Mareb is the boundary on the east, and the Tacazze on the west. It is about 200 miles long from north to south, and 120 broad from west to east. All the merchandize sent across the Red sea to Abyssinia, or from Abyssinia across the Red sea, must pass through this province, so that the governor has his choice of it as it goes along. Thus the province itself is very wealthy; and as the Abyssinian fire-arms are brought from Arabia, the governors of Tigré, by purchasing quantities of them, may easily render themselves very powerful. No arms of this kind can be sent to any person without his permission; nor can any one buy till the governor has first had an offer.

Siré was some time ago united to Tigré, on account of the misconduct of its governor; but was disjoined from it at the time Mr Bruce was in Abyssinia, with the consent of Ras Michael, who bestowed the government of it upon his son. It is about 25 miles long, and as much in breadth. Its western boundary is the Tacazze.

Samen in a very mountainous province lying to the westward of the river Tacazze, about 80 miles long, and in some places 30 broad, though in most it is much narrower. It is mostly inhabited by Jews.

Begemder lies to the north-east of Tigré. It is about 180 miles long and 60 broad; bounded by the river Nile on the west. It comprehends the mountainous country of Lasta; and there are now several small governments dismembered from it. The inhabitants are fierce and barbarous, but reckoned the best soldiers in Abyssinia; and it is said that this province with Lasta can furnish 45,000 horsemen. It abounds with iron mines, which in Abyssinia would be very valuable if properly managed. It is also well stored with beautiful cattle. Near the south end it is cut into vast gullies, seemingly by floods, of which we have no account. This province is reckoned the great barrier against the incursions of the Galla; and though they have often endeavoured to make a settlement in it, they have never yet found it practicable. Several of their tribes have been cut off in the attempt.

Next to Begemder is the province of Amhara, in length about 120 miles, and somewhat more than 40 in breadth. It is very mountainous; and the men are reckoned the handsomest in all Abyssinia. In this province is the mountain or rock Gesben, formerly the residence of the royal family. This province is parallel to Begemder on the south; being separated from it by the river Bahilo. On the west it is bounded by the Nile. The river Gesben is another boundary.

Waleka

Abyssinia. Walaka lies between the rivers Geshen and Samba. It is a low unwholesome province, having Upper Shoa to the southward. It was in this province that the only surviving prince of the family of Solomon was preserved after the massacre by Judith, formerly mentioned; and on this account great privileges were conferred upon the inhabitants, which in some degree continue to this day. The governor is considered as an ally, rather than a subject, of the emperor of Abyssinia; and to preserve his independency, he has allowed the Galla to surround his province entirely, yielding up to them the territory of Walaka above mentioned. Trusting to the valour of his own people, he is under no apprehension of his barbarous neighbours the Galla. This province is also remarkable for the monastery of Debra Libanos, where the famous saint Tecla Haimanout, the founder of the power of the clergy, was bred.

Gojam is remarkable for having in it some of the sources of the Nile. It is bounded on the north by the high mountains of Amid Amid, on the south by the river Nile, on the west by another river named *Gult*, and on the east by the river Temci; on the north-east it has the kingdom of Damot. It is about 40 miles long from north to south, and somewhat more than 20 in breadth from east to west. It is very populous, but the men are accounted the worst soldiers in Abyssinia. There is great plenty of very beautiful cattle.

Beyond the mountains of Amid on the east lies the country of the Agows; on the west it has Buré, Umbarma, and the country of the Gongas; on the south, those of Damot and Gafat; and Dingleber on the south.

Dembea occupies all the space along the lake of the same name from Dingleber below the mountains bounding Guesque and Kuara. Mr Bruce is of opinion, that the lake has formerly overflowed the whole of it; and the decrease of this lake he brings as an instance of the decrease of large pools throughout the world.

To the south of Dembea is the country of Kuara, bordering on that of the Shangalla, the Macrobi of the ancients. The neighbouring countries, inhabited by Pagan savages, produce gold, which is introduced in plenty into this province. None is produced in the province itself, nor indeed does Mr Bruce mention any part of Abyssinia where gold is naturally found. In the lower part of this country is a colony of Pagan blacks named *Ganjar*; derived, according to our author, from the black slaves who came into the country with the Arabs after the invasion of Mahomet. These deserting their masters, formed the colony we speak of; but it is now more increased by vagabonds from other parts than by the multiplication of the inhabitants themselves. The governor of this country is one of the great officers of state: he has kettle-drums of silver, which he is allowed to beat through the streets of Gondar; a privilege allowed to none but himself. This privilege was conferred upon the first governor by David II. who conquered the country.

The frontier countries of Narea, Ras-el-Feel, Tchelga, &c. are wholly inhabited by Mahometans, and the government of them is usually given to strangers. The country is very hot, unwholesome, and covered with thick woods. The people are fugitives from all

nations, but excellent horsemen; making use of no other weapon but the broad sword, with which, however inadequate we might suppose the weapon to be, they will attack the elephant or rhinoceros.

According to Mr Bruce the empire of Abyssinia is bounded on the south by a vast chain of mountains, extending with very little interruption from 34° to 44° E. Long. and between 8° and 9° N. Lat. In more prosperous times it extended beyond these southward, particularly into the kingdom of Adel; but the mountains just mentioned are undoubtedly to be reckoned its natural boundaries on this side. On the east and north-east it has the Red sea, and on the south-east the kingdom of Adel. On the west and north its boundaries are less distinctly marked; having on both these quarters the barbarous kingdom of Sennaar, whose limits will no doubt frequently vary according to the fortune of war betwixt the two princes. From Arkeeko, situated near the foot of the Basaltic mountains, in about 15° 30' N. Lat. it extends to near 7° N. Lat. where the mountains of Caffa, the most southerly province of Abyssinia, terminate. Along the coast of the Red sea lie the territories inhabited by the Hazorta Shiho, the district of Engana Shiho, and the kingdom of Dancali, including the territory of Azab and the salt pits already mentioned. To the westward of these are the province or kingdom of Tigré, including the country of the Dobas, part of the kingdom of Bali, and that of Dawaro. Still farther west are those of Siré, Lasta, Amhara, the greatest part of Bali, and part of Fatigar, which last reaches beyond the mountains. Proceeding still in the same direction, we come to Tcherkin, Tchelga, Abargale, Salao, Begemder, Shoa, and Ifat; reckoning always from north to south; Tcherkin, for instance, being to the northward of Tchelga, &c. Shoa extends a considerable way to the westward; so that, besides Ifat, it has to the south of it also the kingdoms of Hade and Canabut; the latter extending beyond the southern ridge of mountains. To the westward are Ras-el-Feel, Dembea, Gojam, and Damot; and beyond these are the kingdoms of Dembea, Bizamo, Gooderoo, and Guraque; those of Nare or Enarca and Caffa occupying the south-west corner of the empire.

The climate of Abyssinia, though, like other parts of the torrid zone, it was formerly thought to be uninhabitable, is not only tolerable, but in general temperate and healthy. In this respect, however, the uneven surface of the country exposes different situations to the effects of heat and cold, of dryness and moisture, and of a free circulation or a stagnation of the atmosphere, in very various degrees. On the mountains, and in the higher parts of the country, the sky is clear and serene, the air is cool and refreshing, and the people are healthy and sprightly; whilst those who live in some of the vallies, in the vicinity of marshes, and in sandy deserts, experience the pernicious influence of excessive heat, and of a moist, stagnant, and suffocating air: so that the climate depends upon soil and situation as much almost as upon the latitude. Mr Bruce observes, that on the highest mountain of the ridge called Lamalmon, the thermometer stood at 32° in the depth of winter, the wind being north-west, clear and cold, but attended only with bear frost. This, he adds, vanished into dew after



Abyssinia. after a quarter of an hour's sun; nor did he ever see any sign of congelation of water upon the top of the highest mountains. The barometer stood at 19° 9' at noon of the same day, and the thermometer was at 78°. He observed hail to lie for three hours in the forenoon on the mountains of Amid Amid. The range of the barometer and thermometer, according to Mr Bruce's register kept at Gondar from February 19. 1770, to May 31. 1771, will appear from the following table.

| | Barom. | Thermom. | Wind. |
|---------------------------|--------|----------|----------|
| April 29. } 6½ A. M. } | 22.11 | 69° | S. |
| Mar. 29. } 2¼ P. M. } | 20.11 | 75° | E. |
| April 19. } 12 Noon. } | | 91° | W. N. W. |
| July 7. } 12 Noon. } | 21.6 | 54½° | W. |

The rainy season commences in April or the beginning of May, when the sun becomes vertical, and ends in September. The rains generally cease about the 8th of September; a sickly season follows till they begin again, about the 20th of October; they then continue constant, but moderate, till the 8th of November. All epidemic diseases cease with the end of these rains. In order to avoid the inconveniences that attend the overflowing of their rivers during this season, as well as on account of the greater salubrity of elevated situations, the Abyssinians have built many of their towns and villages on the mountains. Their houses are generally very mean, consisting only of one story, and constructed with straw and laths, earth and lime; though there are some of stone and better materials. It is a mistaken notion, however, that they live in tents, and not in houses. In a climate like that of Abyssinia, subject to scorching weather for six months, and to deluges of rain, storms of wind, thunder and lightning, and hurricanes, such as are unknown in Europe, for the other six, it is not probable that they should choose to live in tents, after having known how to build such cities as Axum. In many of the towns and villages, the houses are separated by hedges, which being always green, and intermixed with flowers and fruit trees at certain distances, afford an agreeable prospect, and contribute also to their salubrity.

Diseases. The inhabitants of Abyssinia are subject to violent fevers, which commonly prove fatal on the third day. Those who survive to the fifth day often recover, merely by drinking cold water, and by repeatedly throwing cold water upon them in their beds. The bark is the most effectual remedy; which in critical cases, says Bruce, should be frequently repeated in small doses, and perfect abstinence observed, unless from copious draughts of cold water. Another common disease in Abyssinia, is the tertian fever, which is in no respect different from our tertian, and is successfully treated in the same manner. All fevers terminate in intermittents, and if they continue long, in dysenteries, which are always tedious, and very frequently mortal. Bark and ipecacuanha, in small quantities, water, and fruit not over-ripe, have been found the most effectual remedies. The dysentery, commencing with a constant diarrhoea, is seldom cured, if it begins with the rainy season;

otherwise, small doses of ipecacuanha either remove it, or change it into an intermittent fever, which yields to the bark. Another endemial disease is called *hanzeer*, the hogs or the swine, and is a swelling of the glands of the throat, and under the arms, which by ineffectual attempts for producing suppuration, and opening the tumours, becomes a running sore, and resembles the evil. In connection with this disorder, we may mention those swellings, to which the whole body is subject, but more particularly the arms, thighs, and legs, sometimes accompanied with ulcers in the nose and mouth, which deface the smoothness of the skin, and which on this account are much dreaded by the Abyssinians. The two last diseases sometimes yield to mercurials; but the last is speedily and completely cured by antimonials. Another complaint afflicts those who are in the habit of drinking stagnant water. It is called *farentei*, or the worm of Pharaoh, and appears in all parts of the body, but most frequently in the legs and arms. It is a worm with a small black head and a hooked beak, of a whitish colour, and a white body of a silky texture, resembling a small tendon. The natives seize it by the head and wind it gently round a piece of silk, or a bird's feather, and thus by degrees they extract it without any inconvenience or permanent scar. Mr Bruce suffered much from this complaint, and the breaking of the worm in the operation of extracting it. The most terrible of all the diseases of this climate is the elephantiasis. The cicuta, mercury, and tar-water, were unsuccessfully tried in this complaint: the greatest benefit was derived from whey made of cow's milk. To the alternation of scorching heat and chilling cold, thin clothing, the use of stagnant putrid water for four months, and other such causes, these diseases may be partly, if not wholly, ascribed. The small-pox was introduced into Abyssinia at the time of the siege of Mecca, about the year 356, and the Abyssinian army was the first victim to it.

The great difference of climate, owing to the vast extent and variety of elevation in different parts of this empire, is very perceptible in its soil and productions. The mountains in many places are not only barren, but altogether inaccessible, except by those who make it their constant practice to climb amongst them: and even by them they cannot be ascended without great difficulty and danger. The shapes of these mountains, as we have already had occasion to observe, are very strange and fantastical: exceedingly different from those of Europe; some resembling towers and steeples, while others are like a board or slate set up on end; the base being so narrow, and the whole mountain so high and thin, that it seems wonderful how it can stand. In the valleys, however, and flat parts of the country, the soil is excessively fruitful, though in the warmest places grain cannot be brought to perfection. Wine is also made only in one or two places; but the greatest profusion of fruits of all kinds is to be met with everywhere, as well as many vegetables not to be found in other countries. There is a vast variety of flowers, which adorn the banks of the rivers in such a manner as to make them resemble fine gardens. Among these a species of rose is met with, which grows upon trees, and is much superior in fragrance to those which grow on bushes. Sena, cardamom, ginger, and cotton,

Abyssinia. cotton, are likewise produced here in great quantities. Among the variety of rare plants to be met with in *Abyssinia*, Mr Bruce particularly describes the following.

Plants described by Mr Bruce.

1. The papyrus, the ancient material for paper; which our author supposes to have been a native of Ethiopia, and not of Egypt as has been supposed. 2. Balefan, balm, or balsam plant; a tree growing to the height of 14 or 15 feet, and used for fuel along with other trees in the country. It grows on the coast of the Red sea, among the myrrh trees behind Azab, all the way to Babelmandel. This is the tree producing the balm of Gilead mentioned in Scripture. 3. The *assa*, myrrh, and opocalpasum trees. These grow likewise along the coast of the Red sea. The *assa* or opocalpasum is used in manufactures; and, according to our author, resembles gum *adragant*, probably *tragacanth*. The tree which produces it grows to a great size, and has a beautiful flower, scarce admitting of description without a drawing. 4. The *ergett*, a species of the *mimosa*, is of two kinds; one called *ergett y'dimmo*, or the bloody *ergett*, from the pink colour of its filaments; the other *ergett el kronie*, or the horned *ergett*, with a flower resembling the *acacia vera* or Egyptian thorn. These were both found on the banks of a river named *Amo*, near the great lake *Dembea*. 5. *Enfete*, an herbaceous plant, growing in *Narea*, in swampy places; but it is supposed to grow equally well in any other part of the empire where there is heat and moisture sufficient. It forms a great part of the vegetable food of the *Abyssinians*. It produces a kind of figs, but these are not eatable. When used for food, it is to be cut immediately above the small detached roots, or perhaps a foot or two higher, according to the age of the plant. The green is to be stripped from the upper part till it becomes white; and when soft, it affords an excellent food when eaten with milk or butter. 6. *Kolquall*, a kind of tree, only the lower part of which is woody, the upper part being herbaceous and succulent. The flowers are of a beautiful golden colour, and the fruit turns to a deep crimson; so that the trees make a very beautiful appearance. The whole plant is full of a very acrid and caustic milk. 7. *Rack* is a large tree, growing not only in *Abyssinia* but in many places of *Arabia Felix*. Its wood is so hard and bitter, that no worm will touch it; for which reason it is used by the *Arabs* for constructing their boats. It grows, like the mangrove, among the salt-water of the sea, or about salt springs. 8. *Gir-gir*, or *Geshe el-aube* a kind of grass found about *Ras-el-Feel*, growing to the height of about three feet four inches. 9. The *kantuffa*, a very noxious species of thorn, much more troublesome than any with which we are acquainted, and growing to the height of eight or more feet. The flowers have a strong smell like the flower *mignonet*. 10. The *gaguedi*, is a short tree only about nine feet high, a native of *Lamalmon*. The flowers, which are yellow and very beautiful, turn towards the sun like those of the *helianthus*. 11. The *wansey*, a tree common throughout all *Abyssinia*; flowers exactly on the first day the rains cease. It grows to the height of 18 or 20 feet; having a thick bark and close heavy wood; the first part of which is white, but the rest of a dark colour. The flowers are of a beautiful white colour; but it does not appear to possess any other remarkable property, though it is held in great esti-

mation by the *Abyssinians*, and is even worshipped by the *Galla*. 12. The *farek*, or *Baubinia acuminata*, grows in the country immediately adjacent to the sources of the Nile; being found by Mr Bruce scarce 400 yards distant from the fountain. 13. *Kuara*, is a beautiful tree, growing in the south and south-west parts of *Abyssinia*. It has a fruit like a bean, of a red colour, which in the early ages was made use of as a weight for gold and diamonds; and hence Mr Bruce is of opinion that the name of the imaginary weight *carat* is derived. 14. The *walkuffa*, grows in the hottest parts of Ethiopia. It is a flowering tree, with beautiful white blossoms, which do not appear till towards the middle of January. The flowers have no smell, and are accounted pernicious to bees. The wood is very heavy. 15. The *wooginoos*, or *Brucea anti-dysenterica*, is common throughout the whole empire, but principally on the sides of the valleys. It is a sovereign remedy against the dysentery, a very common and fatal disease in hot countries. Mr Bruce had experimental proof of its antidyenteric virtues. 16. *Cusfo*, or *Banksia anthelmintica*, is a very beautiful and useful tree, being a strong anthelmintic, and used as such by the *Abyssinians*. Every person there, whether male or female is troubled with that kind of worm called *ascarides*; a great number of which are evacuated every month, and the evacuation is promoted by an infusion of this plant. While taking this medicine, the patients sequester themselves from all their acquaintance, and keep close at home. It is said that the want of this medicine in other countries is the reason why the *Abyssinians* do not go out of their own country; or, if they do, that they are short-lived. 17. *Teff*, is a kind of grain sown generally throughout *Abyssinia*; and constituting the bread commonly made use of by the inhabitants. They have indeed plenty of wheat, and are as skilful in forming it into bread as the Europeans; but this is only made use of by people of the first rank: however, the *teff* is sometimes of such an excellent quality, that the bread made from it is held in equal estimation with the finest wheat. From the bread made of this grain a fourth liquor called *bouza* is prepared, which is used for common drink like our small beer. A liquor of the same kind, but of inferior quality, is made from barley cakes. Some have been of opinion, that the use of *teff* occasions the worms above mentioned; but this is controverted by Mr Bruce. *Nook*, a plant not to be distinguished from our *marigold*, either in shape, size, or foliage, is also sown very generally over the country, and furnishes all *Abyssinia* with oil for the kitchen and other uses.

Abyssinia abounds with a vast variety of quadrupeds both wild and tame. Immense numbers of cattle everywhere present themselves, some of them the most beautiful in the world. Some have monstrous horns, said to be capable of holding 10 quarts each; but this, as our author informs us, is a disease which proves fatal to them. *Buffaloes* are here met with in great numbers, and are very fierce and untractable; but there are no such animals as carnivorous bulls, which have been said to exist in this and other internal parts of Africa. *Antelopes* and other wild animals are met with in great numbers in the uncultivated parts; feeding chiefly on the leaves of trees. They abound most of all, however, in those parts which have been once cultivated,

Abyssinia. cultivated, but since desolated by the calamities of war; and where wild oats abound in such quantities as to hide them from pursuit. Hyænas, lions, foxes, jackals, wild boars, &c. are also found, as well as the elephant, rhinoceros, camelopard, and others of the larger and more uncommon kinds. Great havoc is made in the cultivated fields by multitudes of baboons, apes, rats, and mice. There is plenty of hares; but these being reckoned unclean, as well as wild boars, are not used as food. The rivers abound with crocodiles and hippopotami, at least the Nile, and those large streams which flow into it; but a great number have water in them only during the rainy season, and these have neither fish nor any animal that feeds upon them.

Birds.

The number of birds in this country is immense; nor are those of the carnivorous kind at all deficient. Great numbers of eagles, vultures, hawks, and others of that kind are met with, and come punctually every year after the tropical rains have ceased. They feed at first upon the shell-fish which are met with in great quantities on the edges of the deserts, where they had lived in the salt springs; but, being forced from their natural habitations when these springs were swelled by the rains, are afterwards left to perish on dry land. When these fail, their next resource is from the carcasses of the large animals, such as the elephant and rhinoceros, which are killed in the flat country by the hunters. Their next supply is the multitude of rats and field-mice which infest the country after harvest. The vast slaughter of cattle made by the Abyssinian armies, the multitude of persons killed whose bodies are allowed to rot on the field of battle, &c. furnish them also with another resource. These supplies, however, all fail at the beginning of the rainy season, when the hunters and armies return home, and the vast quantity of water which continually overflows the ground renders it impossible for them to find any other food.

There are other birds which feed upon insects, and multitudes which live on grain or seeds of various kinds; all of which are amply supplied by the immense quantity of fruits and berries which grow in Abyssinia, and are ripe at all seasons of the year. A very remarkable particular concerning this is, that the trees which bear fruit all the year round do not carry it always in the same place. The west side is that which blossoms first, and where of consequence the fruit first comes to perfection; the south side succeeds, and goes through the same process; after which, the north blossoms in like manner; and last of all is the east side, which produces flowers and fruit towards the beginning of the rainy season. All the trees of Abyssinia are ever-green; and their leaves are of a thick leathery consistence, and highly varnished to enable them to resist the violent rains which fall during a certain season. The granivorous birds have likewise this advantage, that the rains do not fall at the same time all over the country. It is intersected by a chain of mountains that divide the seasons also; so that they have but a short way to fly in order to become birds of passage, and supply themselves with such food as is necessary for them beyond the mountains. All the pigeons, of which there are many species, are birds of passage, excepting one kind. The owls are ex-

tremely large and beautiful, but few in number. There is a great variety of swallows, several kinds of which are unknown in Europe; but, says our author, "those that are common in Europe appear in passage at the very season when they take their flight from thence. We saw the greatest part of them in the island of Mafuah, where they lighted and tarried two days, and then proceeded with moon-light nights to the south-west." The large birds which reside constantly among the mountains of Samen and Taranta have all their feathers tubular, the hollow part being filled with a kind of yellow dust which issues out in great abundance on hunting them. This was particularly observed by Mr Bruce in a species of eagle which he calls the *golden eagle*; and the dust being viewed through a microscope with a very strong magnifying power, appeared like fine feathers. The crows are spotted white and black, almost in equal proportions. The raven has his feathers intermixed with brown, the tip of his beak white, and a figure like a cup or chalice of white feathers upon his head. Our author saw no sparrows, magpies, nor bats; neither are there many water-fowl, especially of the web-footed kind; but there are vast numbers of storks, which cover the plains in May, when the rains become constant. There are no geese, excepting one species called the *golden goose* or *goose of the Nile*, which is common all over Africa; but there are snipes in all the marshes.

Abyssinia.

Our author describes very few fishes; though he says that an account of these, and other marine productions of the Red sea, which he has painted and collected, would occupy many large volumes, and the engraving cost a sum which he could not by any means afford. Among others, he mentions the *torpedo* and the *binny*, which latter is good food, and grows to a large size; that from which he took the drawing was about 32 pounds weight. Its whole body is covered with beautiful scales resembling silver spangles.

Fishes.

Locusts and a species of ants are extremely troublesome and pernicious in Abyssinia, but the fly by the natives called *tsalsalya* is most destructive to cattle. Mr Bruce gives a particular description of a kind of lizard, and of the cerastes or horned serpent; but denies that serpents are numerous in Abyssinia, as almost all authors have supposed, and as we should be led naturally to suspect. He vouches also for the power that some persons have of enchanting serpents and scorpions, which in some is natural, in others communicated artificially by certain medicines. He prevailed upon those who knew the secret to prepare him by these means as they had done others; but, notwithstanding this assistance, he acknowledges, that when it came to the trial his heart always failed him.

The crown is hereditary in the line of Solomon, but it depends on the minister to choose the particular person who is to enjoy it; and as it is always his inclination to have the government in his own hands, he never fails to choose an infant, who is seldom suffered to live after he comes to the years of maturity. Thus perpetual wars and commotions take place, inasmuch that the ravenous birds, as has been observed, find one great supply of food in the slaughters made by the Abyssinians of one another. All authors indeed agree that the devastations committed by the armies of this country are excessive; inasmuch, that after a long encampment is removed,

Few serpents in Abyssinia.

Method of settling the succession to the crown.

The cause of civil wars.

Excessive destruction by their armies.

Abyssinia. removed, nothing is to be seen all around the place where it was but bare earth. When an army marches through the country, says Mr Bruce, "an inconceivable number of birds and beasts of prey, especially the former, follow it from the first day of its march to its return; increasing always in proportion the more it advances into the country. An army there leaves nothing living behind, not even the vestige of a habitation; but fire and the sword reduce every thing to a wilderness and solitude. The beasts and birds unmolested have the country to themselves, and increase beyond all possible conception. The slovenly manner of this savage people, who, after a battle, bury neither friends nor enemies; the quantity of beasts of burthen that die perpetually under the load of baggage, and variety of mismanagement; the quantity of offal, and half-eaten carcasses of cows, goats, and sheep, which they consume in their march for sustenance; all furnish a stock of carrion sufficient to occasion contagious distempers, were there not such a prodigious number of voracious attendants who consume them almost before putrefaction. There is no giving the reader any idea of their number, unless by comparing them to the sand of the sea. While the army is in motion, they are a black canopy which extends over it for leagues. When encamped, the ground is discoloured with them beyond the sight of the eye; and all the trees are loaded with them."

Immense number of birds which follow them.

Curious method of keeping off the hyænas from the king's palace.

The prodigious number of criminals executed for high treason, whose bodies are cut in pieces and thrown about the streets, invite the hyænas to the capital, in the same manner that the carrion of the camp invites the birds of prey to follow it. The method of keeping off these voracious animals is certainly very curious. "An officer (says Mr Bruce) called *Serach Massery*, with a long whip, begins cracking and making a noise worse than 20 French postillions at the door of the palace before the dawn of day. This chafes away the hyænas and other wild beasts: this too is the signal for the king's rising, who sits in judgment every morning fasting; and after that, about 8 o'clock, he goes to breakfast."

Method of anointing and crowning the king.

From these and other circumstances we should be apt to imagine that the Abyssinians, instead of becoming more civilized, were daily improving in barbarity. The king is anointed at his election with plain oil of olives; "which (says Mr Bruce) being poured upon the crown of his head, he rubs into his long hair indecently enough with both his hands, pretty much as his soldiers do with theirs when they get access to plenty of butter." In former times, however, matters seem to have been conducted with more decency. Socinius, the greatest monarch that ever sat on the Abyssinian throne, was crowned, after having gained a great victory over the Galla, in a very different manner, and with the ceremonies which we are told were in use among the ancient kings of Tigré. At that time he had with him an army of about 30,000 men; and was besides attended by all the great officers dressed in the gayest manner, as well as by the ladies of the first quality in the empire. The king himself, dressed in crimson damask, with a great chain of gold about his neck, his head bare, and mounted on a horse richly caparisoned, advanced at the head of his nobility, passed the outer court, and came to the paved way before the church. Here he was met by a number of young girls,

daughters of the *ambares* or supreme judges, together with many noble virgins standing on the right and left of the court. Two of the noblest of these held in their hands a crimson cord of silk, somewhat thicker than common whip-cord, stretched across from one company to another, as if to shut up the road by which the king was approaching the church. When this cord was prepared and drawn tight about breast-high by the girls, the king entered; advancing moderately quick, and showing his skill in horsemanship as he went along. Being stopped by the tension of the string, the damsels asked, "Who he was?" To this he answered, "I am your king, the king of Ethiopia." But they replied, "You shall not pass; you are not our king." He then retired some paces, and again presented himself. The question was again put, "Who he was?" To which he answered, "I am your king, the king of Israel." But the same reply was still given by the girls. The third time, on being asked, "Who he was?" he answered, "I am your king, the king of Sion;" and drawing his sword, he cut the cord asunder. The damsels then cried out, "It is a truth, you are our king; truly you are the king of Sion." On this they began to sing Hallelujah, and were joined by the whole army and the rest of the king's attendants. Amidst these acclamations the king advanced to the foot of the stair of the church, dismounted, and sat down upon a stone; which, in Mr Bruce's opinion, was plainly an altar of Anubis or the Dog-star. After the king, came a number of priests in proper order. The king was first anointed, then crowned, and accompanied half up the steps by the singing priests. He stopped at a hole made on purpose in one of the steps, where he was fumigated with myrrh, aloes, and cassia: after which divine service was celebrated; and he returned to the camp, where 14 days were spent in feasting and rejoicing.

Ceremonies of this kind are now given over on account of the expence. Our author was informed by Tecla Haimanout, that when he was obliged to retire into Tigré from his enemies, Ras Michael had some thoughts of having him crowned in contempt of his enemies; but by the most moderate calculations that could be made, it would have cost 20,000 ounces of gold, about 80,000l. sterling; on which all thoughts of it were laid aside.

The Abyssinians compute time by the solar year. ^{Mode of computing time.} Thirty days constitute their month, to which they add five days and a quarter, and thus they complete the year. The five days are added to the month of August, and to every fourth year they add a sixth day. They begin their year with the 29th or 30th of August, i. e. the kalends of September; the 29th of August being the first of their month Mascaram. The common epoch which the Abyssinians use is from the creation of the world, and they reckon 5500 years from the creation to the birth of Christ, rejecting the odd eight years of the Greeks, who make this period 5508 years. They have also many other epochs, such as from the council of Nice and Ephesus. In their ecclesiastical computations they make use of the golden number and epact. The first use of epacts amongst them was not earlier, according to Scaliger, than the time of Dioclesian; but Mr Bruce observes, that this is contrary to the positive evidence of Abyssinian history, which says expressly, that the epact was invented by

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Demetrius

Abyssinia.

Demetrius of Alexandria. This Demetrius was the 12th patriarch of Alexandria, and elected about the 190th year of Christ, or in the reign of Severus, and consequently long before the time of Dioclesian. The Abyssinians have another mode of computing time, that is peculiar to themselves. They read the whole of the evangelists, in order, every year in their churches; and when they speak of an event, they write or say, it happened in the days of Matthew; that is, in the first quarter of the year, whilst they were reading the gospel of St Mathew in their churches. They compute the time of the day in a very arbitrary manner. The twilight being very short, is selected for the beginning of their day; this they call Naggé, which comprehends the duration of twilight. Méset expresses the moment when the evening twilight begins. Mid-day is called Kater, which signifies culmination. All the other parts of time they describe, in conversation, by pointing at the place in the heavens where the sun was, when the event, which they are describing, happened.

Manners of the Abyssinians.

With regard to the manners of the Abyssinians, they are represented by Mr Bruce as highly barbarous. Their continual warfare inures them to blood from their infancy; so that even children would not have the least scruple at killing one another or grown up persons if they were able. Many shocking instances of hardness of heart are related by our author in Tecla Haimanout himself, though otherwise an accomplished prince. Their cruelty displays itself abundantly in the punishments inflicted upon criminals, one of which is slaying alive, as has been already related of Woosheka. Cutting in pieces with a sabre is another; and this is performed, not by executioners, whose employment is reckoned disgraceful as in this country, but by officers and people of quality. So little is this thought of indeed in Gondar, the capital of the empire, that Mr Bruce happening to pass by an officer employed in this work, who had three men to dispatch, the officer called to him to stop till he had killed them all, as he wanted to speak to him upon a matter of consequence. Stoning to death is a capital punishment likewise common in this country; and usually inflicted on Roman Catholics if they happen to be found, or upon other heretics in religion.

Their horrid manner of feeding.

It is not to be supposed that people who regard the lives of one another so little, will show much compassion to the brute creation. In this respect, however, the Abyssinians are cruel and savage beyond all people on the face of the earth. There are many instances of people eating raw fish or flesh, and we call them barbarous that do so; but what name shall we give to those who cut off pieces of flesh from animals while still living, and eat it not only raw but still quivering with life! Mr Bruce labours much to prove, that the way of eating not raw, but *living* flesh, was customary among the nations of antiquity: but whatever be in this, he is the only author who mentions it directly; and it is on his single testimony that the fact is established. The Jesuits mention in their books, that the Abyssinians eat raw flesh, but not a word of eating it in this manner; and indeed there are some circumstances which he himself relates seemingly very difficult to be reconciled with known and indubitable facts. He informs us, for instance, that when at no great distance from Axum, the capital of Tigré, he fell

in with three soldiers "driving a cow. They halted at a brook, threw down the beast, and one of them cut a pretty large collop of flesh from its buttock; after which they drove the cow gently on as before." In another place he tells us, that the flesh was taken from the upper part of the buttock; that the skin was flapped over the wound, fastened with a skewer, and a cataplasm of clay put over all. Now it is known to anatomists, that no piece of flesh can be cut off without destroying a muscle; and that the muscles of the buttocks are subservient to the motion of the legs. The Abyssinians therefore must have been expert anatomists to know how to cut off such muscles as would allow the creature still to go on; and if their repast had been two or three times repeated, it is plainly impossible that the cow could at any rate have stirred a step. In his description of their feasts there is more consistency; for there the animal is tied so that it cannot move: after stripping off the skin, the flesh of the buttocks is cut off in solid square pieces, without bones or much effusion of blood; and the prodigious noise the animal makes is a signal for the company to sit down to table. Every man sits between two women, having a long knife in his hand. With this he cuts the flesh, while the motion of its fibres is yet visible, into pieces like dice. These are laid upon pieces of bread made of the grain called *teff*, already mentioned, after being strongly powdered with Cayenne pepper and fossil salt. They are then rolled up like as many cartridges; the men open their mouths, stooping and gaping like idiots, while the women cram them so full of these cartridges, that they seem every moment in danger of being choked; and in proportion to the quantity their mouths can hold, and the noise they make in chewing, they are held in estimation by the company. All this time the animal bleeds but little: but when the large arteries are cut and it expires, the flesh becomes tough; and the wretches who have the rest to eat, gnaw it from the bones like dogs!

Abyssinia.
Abyssinian.

ABYSSINIAN, in *Ecclesiastical History*, is the name of a sect, in the Christian church, established in the empire of Abyssinia. The Abyssinians are a branch of the Copts or Jacobites; with whom they agree in admitting but one nature in Jesus Christ, and rejecting the council of Chalcedon: whence they are also called *Eutyrians*, or *Monophysites*, and stand opposed to the Melchites. They are only distinguished from the Copts, and other sects of Jacobites, by some peculiar national usages.—The Abyssinian sect or church is governed by a bishop or metropolitan styled *Abuna*, sent them by the Coptic patriarch of Alexandria residing at Cairo, who is the only person that ordains priests. The next dignity is that of Komos, or Hegumenos, who is a kind of arch-priest. They have canons also, and monks: the former of whom marry; the latter, at their admission, vow celibacy, but with a reservation: these, it is said, make a promise aloud, before their superior, to keep chastity; but add in a low voice, *as you keep it*. The emperor has a kind of supremacy in ecclesiastical matters. He alone takes cognizance of all ecclesiastical causes, except some smaller ones reserved to the judges; and confers all benefices, except that of Abuna.

There are two classes of monks among the Abyssinians; those of Debra Libanos, and those of St Eustathius. The

Abyssinian. The latter are grossly ignorant. Their head is the superior of the convent of Mahebar Selaissé, in the north-west part of Abyssinia, near Kuara and the Shangalla, towards Sennaar and the river Dender. The chief of the former is the Itchegué who is ordained in the following manner. Two chief priests hold a white cloth or veil, over his head, a third repeats a prayer, and then they all lay their hands on his head, and join together in singing psalms. In turbulent times this Itchegué has more extensive influence than even the Abuna.—The monks do not live in convents, but in separate houses round their church; and each cultivates for himself a portion of the land which is assigned them as their property.—The churches are built on eminences, in the vicinity of running water, for the advantage of purifications and ablutions, according to the Levitical law, and are surrounded with rows of Virginia cedar. They are circular buildings with conical summits and thatched roofs, and encompassed on the outside with pillars of cedar, to which the roof projecting eight feet beyond the wall is fixed, and forms an agreeable walk in the hot or rainy season. The internal partition and arrangement of the church, is that prescribed by the Mosaic law; and many of the ceremonies and observances in their mode of worship, are obviously derived from the ceremonial rites of the Jewish religion.

The Abyssinians have at different times expressed an inclination to be reconciled to the see of Rome; but rather out of interest of state than any other motive. The emperor David, or the queen regent on his behalf, wrote a letter on this head to Pope Clement VII. full of submission, and demanding a patriarch from Rome to be instructed by: which being complied with, he publicly abjured the doctrine of Eutychius and Dioscorus in 1626, and allowed the supremacy of the Pope. Under the emperor Sultan Seghed all was undone again; the Romish missionaries settled there had their churches taken from them, and their new converts banished or put to death. The congregation *de propaganda* have made several attempts to revive the mission, but to little purpose.—The doctrines and ritual of this sectary form a strange compound of Judaism, Christianity, and superstition. They practise circumcision; and are said to extend the practice to the females as well as males: They observe both Saturday and Sunday as Sabbaths: they eat no meats prohibited by the law of Moses: women are obliged to the legal purifications: and brothers marry their brothers wives, &c. On the other hand, they celebrate the epiphany with peculiar festivity, in memory of Christ's baptism; when they plunge and sport in ponds and rivers; which has occasioned some to affirm that they were baptized anew every year. Among the saints days is one consecrated to Pilate and his wife; because Pilate washed his hands before he pronounced sentence on Christ, and his wife desired him to have nothing to do with the blood of that just person. They have four lents: the great one commences ten days earlier than ours, and is observed with much severity, many abstaining therein even from fish, because St Paul says there is one kind of flesh of men, and another of fishes. They allow of divorce, which is easily granted among them, and by the civil judge; nor do their civil laws prohibit polygamy itself. They have

at least as many miracles and legends of saints as the Romish church; which proved no small embarrassment to the Jesuit missionaries, to whom they produced so many miracles, wrought by their saints, in proof of their religion, and those so well circumstantiated and attested, that the Jesuits were obliged to deny miracles to be any evidence of a true religion; and in proof hereof, to allege the same arguments against the Abyssinians which Protestants in Europe allege against Papists. They pray for the dead, and invoke saints and angels; have so great a veneration for the virgin, that they charged the Jesuits with not rendering her honour enough. They venerate images in painting; but abhor all those in relief, except the cross. They hold that the soul of man is not created; because, say they, God finished all his works on the sixth day. They admit the apocryphal books, and the canons of the apostles as well as the apostolical constitutions, for genuine. Their liturgy is given by Alvarez, and in English by Pagit; and their calendar by Ludolph.

ACA, ACE, or ACON, in *Ancient Geography*, a town of Phœnicia, on the Mediterranean; afterwards called *Ptolemais*; now *Acre*. See **ACRE**.

ACACALOTL, the Brasilian name of a bird called by some *corvus aquaticus*, or the water raven: properly, the pelicanus carbo, or corvorant. See **ORNITHOLOGY Index**.

ACACIA, EGYPTIAN THORN, or BINDING BEAN-TREE, in *Botany*, a species of mimosa, according to Linnæus; though other botanists make it a distinct genus. See **MIMOSA, BOTANY Index**.

The flowers of a species of the acacia are used by the Chinese in making that yellow which we see bears washing in their silks and stuffs, and appears with so much elegance in their painting on paper. The method is this:

They gather the flowers before they are fully open; these they put into a clean earthen vessel over a gentle heat, and stir them continually about as they do the tea leaves, till they become dryish and of a yellow colour; then to half a pound of the flowers they add three spoonfuls of fair water, and after that a little more, till there is just enough to hold the flowers incorporated together; they boil this for some time, and the juice of the flowers mixing with the water, it becomes thick and yellow; they then take it from the fire, and strain it through a piece of coarse silk. To the liquor they add half an ounce of common alum, and an ounce of calcined oyster shells reduced to a fine powder. All is then well mixed together; and this is the fine lasting yellow they have so long used.

The dyers of large pieces use the flowers and seeds of the acacia for dying three different sorts of yellow. They roast the flowers, as before observed; and then mix the seeds with them, which must be gathered for this purpose when full ripe: by different admixture of these, they give the different shades of colour, only for the deepest of all they add a small quantity of Brazil wood.

Mr Geoffroy attributes the origin of bezoar to the seeds of this plant; which being bruised by certain animals, and vellicating the stomach by their great founness and astringency, cause a condensation of the juices, till at length they become coated over with a stony matter, which we call **BEZOAR**.

Acacia
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Acacius.

Falſe ACACIA. See ROBINIA, BOTANY *Index.*
Three-thorned ACACIA, or *Honey-locuſt.* See GLEDITSIA, BOTANY *Index.*

ACACIA, in the *materia medica*, the inſpiffated juice of the unripe fruit of the *MIMOSA Nilotica*.

The juice is brought to us from Egypt, in roundiſh maſſes, wrapt up in thin bladders. It is outwardly of a deep brown colour, inclining to black; inwardly of a reddiſh or yellowiſh brown; of a firm conſiſtence, but not very dry. It ſoon ſoftens in the mouth, and diſcovers a rough, not diſagreeable taſte, which is followed by a ſweetiſh reliſh. This inſpiffated juice entirely diſſolves in watery liquors; but is ſcarce ſenſibly acted on by rectified ſpirit.

Acacia is a mild aſtringent medicine. The Egyptians give it in ſpitting of blood, in the quantity of a drachm, diſſolved in any convenient liquor; and repeat this doſe occaſionally: they likewiſe employ it in collyria for ſtrengthening the eyes, and in gargariſms for quinſeys. Among us, it is little otherwiſe uſed than as an ingredient in mithridate and theriaca, and is rarely met with in the ſhops. What is uſually ſold for the Egyptian acacia, is the inſpiffated juice of unripe ſloes; this is harder, heavier, of a darker colour, and ſomewhat ſharper taſte, than the true ſort. See the next article.

German ACACIA, the juice of unripe ſloes inſpiffated nearly to dryneſs over a gentle fire, care being taken to prevent its burning. It is moderately aſtringent, ſimilar to the Egyptian acacia, for which it has been commonly ſubſtituted in the ſhops. It is given in fluxes, and other diſorders where ſtyptic medicines are indicated, from a ſcruple to a drachm.

ACACIA, among antiquaries, ſomething reſembling a roll or bag, ſeen on medals, as in the hands of ſeveral conſuls and emperors. Some take it to repreſent a handkerchief rolled up, wherewith they made ſignals at the games; others a roll of petitions or memorials; and ſome, a purple bag full of earth, to remind them of their mortality.

ACACIANS, in *Eccleſiaſtical Hiſtory*, the name of ſeveral ſects of heretics; ſome of which maintained, that the Son was only a ſimilar, not the ſame, ſubſtance with the Father; and others, that he was not only a diſtinct but a diſſimilar ſubſtance. Two of theſe ſects had their denominations from Acacius biſhop of Cæſarea, who lived in the fourth century, and changed his opinions, ſo as, at different times, to be head of both. Another was named from Acacius patriarch of Conſtantinople, who lived in the cloſe of the fifth century.

ACACIUS, ſurnamed LUSCUS, becauſe he was blind of one eye, was biſhop of Cæſarca in Paleſtine, and ſucceeded the famous Eufebius: he had a great ſhare in the baniſhment of Pope Liberius, and bringing Felix to the ſee of Rome. He gave name to a ſect, and died about the year 365. He wrote the life of Eufebius, which is loſt, and ſeveral other works.

ACACIUS, *Saint*, biſhop of Amida in Meſopotamia, in 420, was diſtinguiſhed by his piety and charity. He ſold the plate belonging to his church, to redeem ſeven thouſand Perſian ſlavs who were periſhing with hunger. He gave each of them ſome money and ſent them home. Vcranius their king was ſo affected with this noble inſtance of benevolence, that he deſired to ſee the biſhop;

and this interview procured a peace between that prince and Theodoſius I.

There have been ſeveral other eminent perſons of the ſame name; particularly, a martyr under the emperor Decius: a patriarch of Antioch, who ſucceeded Baſil in 458, and died in 459: a biſhop of Miletum in the fifth century: a famous rhetorician in the reign of the emperor Julian: and, a patriarch of Conſtantinople in the fifth century; who was ambitious to draw the whole power and authority of Rome by degrees to Conſtantinople, for which he was excommunicated by Pope Felix II. He in his turn paſſed ſentence of excommunication againſt the pope. Still, however, he held his patriarchate till his death in 488.

ACAD, or Achad, in *Ancient Geography*, the town in which Nimrod reigned, called *Archad* by the Seventy; ſituated in Babylonia, to the eaſtward of the Tigris.

ACADEMICIAN, or ACADEMIST, a member of an academy. See ACADEMY in the modern ſenſe.

ACADEMICS, or ACADEMISTS, a denomination given to the cultivators of a ſpecies of philoſophy originally derived from Socrates, and afterwards illuſtrated and enforced by Plato, who taught in a grove near Athens, conſecrated to the memory of Academus, an Athenian hero; from which circumſtance this philoſophy received the name of *Academical*. Before the days of Plato, philoſophy had in a great meaſure fallen into contempt. The contradictory ſyſtems and hypotheses which had ſucceſſively been urged upon the world were become ſo numerous, that, from a view of this inconſtancy and uncertainty of human opinions, many were led to conclude, that truth lay beyond the reach of our comprehension. Abſolute and univerſal ſcepticiſm was the natural conſequence of this concluſion. In order to remedy this abuſe of philoſophy and of the human faculties, Plato laid hold of the principles of the academical philoſophy; and, in his Phædo, reaſons in the following manner: "If we are unable to diſcover truth (ſays he), it muſt be owing to two circumſtances: either there is no truth in the nature of things; or the mind, from a defect in its powers, is not able to apprehend it. Upon the latter ſuppoſition, all the uncertainty and fluctuation in the opinions and judgments of mankind admit of an eaſy ſolution: Let us therefore be modeſt, and aſcribe our errors to the real weakneſs of our own minds, and not to the nature of things themſelves. Truth is often difficult of acceſs: in order to come at it, we muſt proceed with caution and diffidence, carefully examining every ſtep; and, after all our labour, we will frequently find our greateſt efforts diſappointed, and be obliged to confeſs our ignorance and weakneſs."

Labour and caution in their reſearches, in oppoſition to raſh and haſty deciſions, were the diſtinguiſhing characteriſtics of the diſciples of the ancient academy. A philoſopher, poſſeſſed of theſe principles, will be ſlow in his progreſs; but will ſeldom fall into errors, or have occaſion to alter his opinion after it is once formed. Vanity and precipitance are the great ſources of ſcepticiſm: hurried on by theſe, inſtead of attending to the cool and deliberate principles recommended by the academy, ſeveral of our modern philoſophers have plunged themſelves into an abſurd and ridiculous kind of ſcepticiſm. They pretend to diſcredit ſubjects that

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Academy. are plain, simple, and easily comprehended : but give peremptory and decisive judgments upon things that evidently exceed the limits of our capacity. Of these, Berkeley and Hume are the most considerable. Berkeley denied the existence of every thing, excepting his own ideas. Mr Hume has gone a step further, and questioned even the existence of ideas; but at the same time has not hesitated to give determined opinions with regard to eternity, providence, and a future state, miraculous interpositions of the Deity, &c. subjects far above the reach of our faculties. In his essay on the academical or sceptical philosophy, he has confounded two very opposite species of philosophy. After the days of Plato, indeed, the principles of the first academy were grossly corrupted by Arcefilas, Carneades, &c. This might lead Mr Hume into the notion that the *academical* and *sceptical* philosophy were synonymous terms. But no principles can be of a more opposite nature than those which were inculcated by the old academy of Socrates and Plato, and the sceptical notions which were propagated by Arcefilas, Carneades, and the other disciples of the succeeding academies.

ACADEMY, in *Antiquity*, a garden, villa, or grove, situated within a mile of Athens, where Plato and his followers held their philosophical conferences. It took its name from one Academus, or Ecademus, who was the original owner of it, and made it a kind of gymnasium. He lived in the time of Theseus; and, after his death, it retained his name, and was consecrated to his memory. Cimon embellished it with fountains, trees, and walks; but Sylla, during the siege of Athens, employed these very trees in making battering engines against the city. Cicero too had his villa, or place of retirement, near Puzzuoli, which he also named an *academy*, where he composed his *Academical Questions*, and his book *De Natura Deorum*.

ACADEMY, among the moderns, is most commonly used to signify a society of learned men, established for the improvement of any art or science, and generally under the protection of a prince. Ptolemy Soter, for the encouragement and improvement of the liberal arts in his dominions, founded an academy at Alexandria, and provided it with a collection of books which was the foundation of the Alexandrian library.

Theodosius the younger established an academy at Constantinople, and appointed professors of every science, with the view of making it a rival institution to that at Rome; which, with the other literary seminaries, had been destroyed by the Goths about the end of the fourth and the beginning of the fifth centuries.

The first academy we read of was established by Charlemagne, at the instigation of ALCUIN. It was composed of the chief wits of the court, the emperor himself being a member. In their academical conferences, every person was to give an account of what ancient authors he had read; and each even assumed the name of some ancient author who pleased him most, or some celebrated person of antiquity. Alcuin, from whose letters we learn those particulars, took that of Flaccus, the surname of Horace: a young lord, named Augilbert, took that of Homer: Adelaar, bishop of Corbie, was called Augustine: Ricalse, bishop of Mentz, was Dametas; and the king himself, David.

This shows the mistake of some modern writers, who relate, that it was in conformity with the genius of the learned men of those times, who were great admirers of Roman names, that Alcuin took the name of Flaccus Albinus.

Most nations have now their academies; but Italy has the greatest number. Many flourishing academies existed in France before the revolution. Most of them were established by Louis XIV. We have but few in Britain; and those of chiefest note go by a different name, viz. SOCIETY.

In giving an account of the principal academies, it seems most proper to arrange them according to their subjects.

I. *MEDICAL Academies*, as that of the *Naturæ Curiosæ* in Germany; that founded at Palermo in 1645; another at Venice in 1701, which meets weekly in a hall near the grand hospital; another at Geneva in 1715, in the house of M. le Clerc. The colleges of physicians at London and Edinburgh, are also, by some, ranked in the number of academies.

The *Academy of Naturæ Curiosæ*, called also the *Leopoldine Academy*, was founded in 1652 by Jo. Laur. Baufchius, a physician; who, in imitation of the English, published an invitation to all physicians to communicate their extraordinary cases; and, meeting with success, was elected president. Their works were at first published separately; but in 1670 a new scheme was laid for publishing a volume of observations every year. The first volume appeared in 1684, under the title of *Ephemerides*, and the work has been continued with some interruptions and variations of the title, &c. In 1687, the emperor Leopold took the society under his protection, granting the members several privileges, particularly that their presidents should be counts palatine of the holy Roman empire. This academy has no fixed residence, nor regular assemblies: instead of these, there is a kind of bureau, or office, first established at Breslau, and afterwards removed to Nuremberg, where letters, observations, &c. from correspondents or members are taken in. The academy consists of a president, two adjuncts or secretaries, and colleagues or members without restriction. The colleagues, at their admission, oblige themselves to two things; first, to chuse some subject out of the animal, vegetable, or mineral kingdom, for discussion, provided it had not been treated of by any colleague before; the second, to apply themselves to furnish materials for the Annual Ephemerides. Each member to bear a symbol of the academy; viz. a gold ring; whereon, instead of a stone, is a book open, and, on the face thereof, an eye; on the other side the motto of the academy, *Nunquam otiosus*.

II. *CHIRURGICAL Academies*; as that instituted some years ago, by public authority, at Paris: the members of which were not only to publish their own and correspondents observations and improvements; but to give an account of all that is published on surgery, and to compose a complete history of the art, by their extracts from all the authors ancient and modern who have wrote on it. A question in surgery was annually proposed by the academy, and a gold medal of 200 livres value was given to the successful competitor.

Academy of Surgery at Vienna, was instituted some years ago by the present emperor, under the direction

Academies. of the celebrated Brambilla. In this there were at first only two professors; and to their charge the instruction of 130 young men was committed, 30 of whom had formerly been surgeons in the army. But of late the number both of the teachers and pupils has been considerably increased. Gabrieli has been appointed to teach pathology and practice; Boecking, anatomy, physiology, and physics; Streit, medical and pharmaceutical surgery; Hunczowsky, surgical operations, midwifery, and the *chirurgia forensis*; and Plenck, chemistry and botany. To these also has been added, Beindl as professor and extraordinary professor of surgery and anatomy. Besides this, the emperor, with his usual liberality, has provided a large and splendid edifice in Vienna, which affords habitation both for the teachers, the students, pregnant women, patients for clinical lectures, and servants. He has also purchased for the use of this academy a medical library, which is open every day; a complete set of surgical instruments; an apparatus for experiments in natural philosophy; a collection of natural history; a number of anatomical and pathological preparations; a collection of preparations in wax brought from Florence; and a variety of other useful articles. Adjoining to the building also there is a good botanical garden.

Among other parts of this institution, three prize medals, each of the value of 40 florins, are to be annually bestowed on those students who return the best answer to questions proposed the year before. These prizes are not entirely founded by the emperor, but are in part owing to the liberality of Brendellus, the protochirurgus at Vienna.

III. *ECCLESIASTICAL Academies*; as that at Bologna in Italy, instituted in 1687, employed in the examination of the doctrine, discipline, and history, of each age of the church.

IV. *COSMOGRAPHICAL Academies*; as that at Venice, called the *Argonauts*. This was instituted at the solicitation of F. Coronelli, for the improvement of geographical knowledge. Its design was to publish exact maps, both celestial and terrestrial, as well particular as general, together with geographical, historical, and astronomical descriptions. Each member, in order to defray the expence of such a publication, was to subscribe a proportional sum, for which they were to receive one or more copies of each piece published. For this end three societies are settled; one under F. Moro, provincial of the Minorites in Hungary; another under the Abbot Laurence au Ruy Payenne au Marais; the third under F. Baldigiani, Jesuit professor of mathematics in the Roman college. The device of this academy is the terraqueous globe, with the motto *Plus ultra*; and at its expence all the globes, maps, and geographical writings, of F. Coronelli have been published.

V. *Academies of SCIENCES*.—These comprehend such as are erected for improving natural and mathematical knowledge. They are otherwise called *Philosophical* and *Physical* academies.

The first of these was instituted at Naples, about the year 1560, in the house of Baptista Porta. It was called the *Academy Secretorum Naturæ*; and was succeeded by the Academy of *Lyncei*, founded at Rome by Prince Frederic Cesi, towards the end of that century. Several of the members of this academy rendered it fa-

Academies. mous by their discoveries; among these was the celebrated Galileo. Several other academies were instituted about that time, which contributed greatly to the advancement of the sciences; but none of them comparable to that of the *Lyncei*.

Some years after the death of Torricelli, the *Academy del Cimento* made its appearance, under the protection of Prince Leopold, afterwards Cardinal de Medicis. Redi was one of its chief members: and the studies pursued by the rest may be collected from those curious experiments published in 1667, by their secretary Count Laurence Magulotti, under the title of *Saggi di Naturali Esperienze*; a copy of which was presented to the Royal Society, translated into English by Mr Waller, and published at London in 4to.

The *Academy degl' Inquiciti*, afterwards incorporated into that of Della Tracia in the same city, followed the example of that of Del Cimento. Some excellent discourses on physical and mathematical subjects, by Geminiano Montenari, one of the chief members, were published in 1667, under the title of *Penfieri Fifico-Matematici*.

The *Academy of Rossano*, in the kingdom of Naples, was originally an academy of belles lettres, founded in 1540, and transformed into an academy of sciences in 1695 at the solicitation of the learned Abbot Don Giacinto Gimma; who being made president, under the title of Promoter General thereof, gave them a new set of regulations. He divided the academists into the following classes: Grammarians, Rhetoricians, Poets, Historians, Philosophers, Physicians, Mathematicians, Lawyers, and Divines, with a class apart for Cardinals and persons of quality. To be admitted a member, a man must have some degrees in the faculty. The members are not allowed to take the title of *Academists* in the beginning of their books, without a written permission from their president, which is not granted till the work has been examined by the censors of the academy; and the permission is the greatest honour the academy can confer, as they thereby adopt the work, and are answerable for it against all criticisms that may be made upon it. To this law the president or promoter himself is subject; and no academist is allowed to publish any thing against the writings of another without leave from the society.

Several other academies of *Sciences* have been founded in Italy; but, for want of being supported by princes, did not continue long. The loss of them, however, was abundantly repaired by the institution of others still subsisting: such as, the *Academy of Filarmenici* at Verona; of *Ricovatri* at Padua, where a learned discourse on the origin of springs was delivered by Sig. Vallisnieri, first professor of physic in the university of that city, and which was afterwards printed. To the Academy of the *Muti de Reggio*, at Modena, the same Sig. Vallisnieri presented an excellent discourse on the scale of created beings, since inserted in his history of the generation of man and animals, printed at Venice in the year 1721.

F. Merfenne, is said to have given the first idea of a philosophical academy in France, towards the beginning of the 17th century, by the conferences of naturalists and mathematicians occasionally held at his lodgings; at which Gassendi, Des Cartes, Hobbes, Roberval, Pascal, Blondel, and others assisted. F. Merfenne

Academies. fenne proposed to each certain problems to examine, or certain experiments to be made. These private assemblies were succeeded by more public ones, formed by Mr Montmort, and Mr Thevenot the celebrated traveller. The French example animated several Englishmen of distinction and learning to erect a kind of philosophical academy at Oxford, towards the close of Oliver Cromwell's administration; which, after the Restoration, was erected into a Royal Society. See SOCIETY. The English example, in its turn, animated the French. Louis XIV. in 1666, assisted by the counsels of M. Colbert, founded an academy of sciences at Paris, with a sufficient revenue to defray the charge of experiments, and salaries to the members.

Royal Academy of Sciences. After the peace of the Pyrenees, Louis XIV. being desirous of establishing the arts, sciences, and literature, upon a solid foundation, directed M. Colbert to form a society of men of known abilities and experience in the different branches, who should meet together under the king's protection, and communicate their respective discoveries. Accordingly M. Colbert, having conferred with those who were at that time most celebrated for their learning, resolved to form a society of such persons as were conversant in natural philosophy and mathematics, to join to them other persons skilled in history and other branches of erudition, along with those who were entirely engaged in what are called the *Belles Lettres*, grammar, eloquence, and poetry. The geometricians and natural philosophers were ordered to meet on Tuesdays and Saturdays, in a great hall of the king's library, where the books of mathematics and natural philosophy were contained; the learned in history to assemble on Mondays and Thursdays, in the hall where the books of history were contained; and the class of belles lettres to assemble on Wednesdays and Fridays. All the different classes were likewise ordered to meet together upon the first Thursday of every month; and, by their respective secretaries, make a report of the proceedings of the foregoing month.

In a short time, however, the classes of history, belles lettres, &c. were united to the *French Academy*, which was originally instituted for the improvement and refining the French language; so that the Royal Academy contained only two classes, viz. that of natural philosophy and mathematics.

In the 1696, the king, by a proclamation dated the 26th of January, gave this academy a new form, and put it upon a more respectable footing. It was now to be composed of four kinds of members, viz. *honorary, pensionary, associates, and eleves*. These last were a kind of pupils, or scholars, each of whom was attached to one of the pensionaries. The first class to contain ten persons, and each of the rest twenty. The honorary academists to be all inhabitants of France; the pensionaries all to reside at Paris; eight of the associates allowed to be foreigners; and the eleves all to live at Paris. The officers to be, a president named by the king, out of the class of honorary academists; and a secretary and treasurer to be perpetual. Of the pensionaries, three to be geometricians, three astronomers, three mechanics, three anatomists, three chemists, three botanists, and the remaining two to be secretary and treasurer. Of the twelve associates, two to apply themselves to geometry, two to botany, and

two to chemistry. The eleves to apply themselves to the same kind of science with the pensionaries they were attached to; and not to speak, except when called by the president. No regular or religious to be admitted, except into the class of honorary academists; nor any person to be admitted either for associate or pensionary, unless known by some considerable printed work, some machine, or other discovery. The assemblies were held on Wednesdays and Saturdays, unless either of them happened to be a holiday, and then the assembly was held on the preceding day. To encourage the members to pursue their labours, the king engaged not only to pay the ordinary pensions, but even to give extraordinary gratifications according to the merit of their respective performances; furnishing withal the expence of the experiments and other inquiries necessary to be made. If any member gave in a bill of charges of experiments he had made, or desired the printing of any book, and brought in the charges of gravings, the money was immediately paid by the king, upon the president's allowing and signing the bill. So, if an anatomist required live tortoises, for instance, for making experiments about the heart, &c. as many as he pleased were brought him at the king's charge. Their motto was *Invenit et perfecit*.

In the year 1716, the duke of Orleans, then regent, made an alteration in their constitution; augmenting the number of honoraries, and of associates capable of being foreigners, to 12; admitting regulars among such associates; and suppressing the class of eleves, as it appeared to be attended with some inconveniences, particularly that of making too great an inequality among the academists, and being productive of some misunderstandings and animosities among the members. At the same time he created other two classes; one consisting of 12 adjuncts, who, as well as the associates, were allowed a deliberative voice in matters relative to science; and the other six free associates, who were not attached to any particular science, nor obliged to pursue any particular work.

Since its re-establishment in 1699, this academy has been very exact in publishing, every year, a volume containing either the works of its own members, or such memoirs as have been composed and read to the academy during the course of that year. To each volume is prefixed the history of the academy, or an extract of the memoirs, and, in general, of whatever has been read or said in the academy; at the end of the history, are the eulogiums on such academists as have died that year. M. Rouille de Meilay, counsellor to the parliament of Paris, founded two prizes, one of 2500, and the other of 2000 livres, which were alternately distributed by the parliament every year: the subject for the first must relate to physical astronomy, and those for the latter to navigation and commerce.

Notwithstanding the advantages which the members of this academy enjoyed over others, in having their expences defrayed, and even being paid for their time and attendance, they had fallen under some imputations, particularly that of plagiarism, or borrowing their neighbours inventions; but with what justice we do not say. This academy was suppressed and abolished by the convention in 1793; and other institutions have been established. See INSTITUTE.

The French had also considerable academies in most

Academies. of their great cities: as, at Montpellier, a royal academy of sciences on the like footing as that at Paris, being as it were a counter part thereof; at Thoulouse, an academy under the denomination of Lanternists; others at Nismes, Arles, Lyons, Dijon, Bourdeaux, &c.

The Royal Academy of Sciences at Berlin was founded in 1700, by Frederic II. king of Prussia, on the model of that of England; excepting that, besides natural knowledge, it likewise comprehends the belles lettres. In 1710, it was ordained that the president shall be one of the counsellors of state, and nominated by the king. The members were divided into four classes; the first for prosecuting physics, medicine, and chemistry; the second for mathematics, astronomy, and mechanics; the third for the German language and the history of the country; the fourth for oriental learning, particularly as it may concern the propagation of the gospel among infidels. Each class to elect a director for themselves, who shall hold his post for life. The members of any of the classes have free admission into the assemblies of any of the rest.

The great promoter of this institution was the celebrated Mr Leibnitz, who accordingly was made the first director. The first volume of their transactions was published in 1710, under the title of *Miscellanea Berolinensia*; and though they received but few marks of the royal favour for some time, they continued to publish new volumes in 1723, 1727, 1734, and 1740. At last, however, Frederic III. the late king of Prussia, gave new vigour to this academy, by inviting to Berlin such foreigners as were most distinguished for their merit in literature, and encouraged his subjects to prosecute the study and cultivation of the sciences by giving ample rewards; and thinking that the academy, which till that time had had some minister or opulent nobleman for its president, would find an advantage in having a man of letters at its head, he conferred that honour on M. Maupertuis. At the same time, he gave a new regulation to the academy, and took upon himself the title of its protector.

The academists hold two public assemblies annually; one in January, on the late king's birth day; and the other in May, on the day of his accession to the throne. At the latter of these is given, as a prize, a gold medal of 50 ducats value: the subject for this prize is successively natural philosophy, mathematics, metaphysics, and erudition.

The Imperial Academy of Sciences at Petersburg was projected by Czar Peter the Great. That great monarch having, during his travels, observed the advantage of public societies for the encouragement and promotion of literature, formed the design of founding an academy of sciences at St Petersburg. By the advice of Wolf and Leibnitz, whom he consulted on this occasion, the society was regulated, and several learned foreigners were invited to become members. Peter himself drew the plan, and signed it on the 10th of February 1724; but was prevented, by the suddenness of his death, from carrying it into execution. His decease, however, did not prevent its completion: for on the 21st of December 1725, Catherine I. established it according to Peter's plan; and on the 27th of the same month the society was first assembled. On the 1st of August 1726, Catharine honoured the meeting

Academies. with her presence, when Professor Bulfinger, a German naturalist of great eminence, pronounced an oration upon the advances made by the loadstone and needle for the discovery of the longitude.

The empress settled a fund of 49821. *per annum* for the support of the academy; and fifteen members, all eminent for their learning and talents, were admitted and pensioned, under the title of Professors in the various branches of literature and science. The most distinguished of these professors were Nicholas and Daniel Bernoulli, the two De Lilles, Bulfinger, and Wolf.

During the short reign of Peter II. the salaries of the members were discontinued, and the academy was utterly neglected by the court; but it was again patronized by the empress Anne, who even added a seminary for the education of youth, under the superintendance of the professors. Both institutions flourished for some time under the direction of Baron Korf; but upon his death, towards the latter end of Anne's reign, an ignorant person being appointed president, many of the most able members quitted Russia. At the accession of Elizabeth, new life and vigour were again restored to the academy: the original plan was enlarged and improved; some of the most learned foreigners were again drawn to Petersburg; and, what was considered as a good omen for the literature of Russia, two natives, Lomonosof and Rumovskiy, men of genius and abilities, who had prosecuted their studies in foreign universities, were enrolled among its members. The annual income was increased to 10,659l. and soon afterwards the new institution took place.

The late empress Catherine II. with her usual zeal for promoting the diffusion of knowledge, took this useful society under her more immediate protection. She altered the court of directors greatly to the advantage of the whole body; corrected many of its abuses, and infused a new vigour and spirit into their researches. By her majesty's particular recommendation, the most ingenious professors visited the various provinces of her vast dominions; and as the fund of the academy was not sufficient to supply the whole expense of these several expeditions, the empress bestowed a largess of 2000l. which she renewed as occasion required.

The purpose and intent of these travels will appear from the instructions given by the academy to the several persons who were engaged in them. They were ordered to pursue their inquiries upon the different sorts of earths and waters; upon the best methods of cultivating the barren and desert spots; upon the local disorders incident to men and animals, and the most efficacious means of relieving them; upon the breeding of cattle, and particularly of sheep; on the rearing of bees and silk worms; on the different places and objects for fishing and hunting; on minerals; on the arts and trades; and on forming a *Flora Russica*, or collection of indigenous plants: they were particularly instructed to rectify the longitude and latitude of the principal towns; to make astronomical, geographical, and meteorological observations; to trace the course of the rivers; to take the most exact charts; and to be very distinct and accurate in remarking and describing the manners and customs of the different people, their dresses, languages, antiquities, traditions, history, religion;

Academies. gion; and, in a word, to gain every information which might tend to illustrate the real state of the whole Russian empire.

In consequence of these expeditions, perhaps no country can boast, within the space of so few years, such a number of excellent publications on its internal state, on its natural productions, on its topography, geography, and history; on the manners, customs, and languages of the different people, as have issued from the press of this academy.

The first transactions of this society were published in 1728, and entitled *Commentarii Academiæ Scientiarum Imperialis Petropolitane ad ann. 1726*, with a dedication to Peter II. The publication was continued under this form until the year 1747, when its transactions were called *Novi Commentarii Academiæ*, &c. In 1777 the academy again changed the title into *Acta Academiæ Scientiarum Imperialis Petropolitane*, and likewise made some alteration in the arrangement and plan of the work. The papers, which had been hitherto published in the Latin tongue, are now written either in that language or French; and a preface is added, styled *Partie Historique*, which contains an account of its proceedings, meetings, admission of new members, and other remarkable occurrences. Of the Commentaries, 14 volumes were published: the first of the New Commentaries made its appearance in 1750, and the twentieth in 1776. Under the new title of *Acta Academiæ*, several volumes have been given to the public, and two are printed every year. These transactions abound with ingenious and elaborate disquisitions upon various parts of science and natural history, and which reflect the greatest honour upon their authors; and it may not be an exaggeration to assert, that no society in Europe has more distinguished itself for the excellence of its publications, and particularly in the more abstruse parts of the pure and mixed mathematics.

The academy is still composed, as at first, of fifteen professors, besides the president and director. Each of these professors has a house and an annual stipend from 200l. to 600l. Beside the professors, there are four adjuncts, who are pensioned, and who are present at the sittings of the society, and succeed to the first vacancies. The direction of the academy is at present assigned to the princefs Dalkhof.

The building and apparatus of this academy are extraordinary. There is a fine library, consisting of 36,000 curious books and manuscripts. There is an extensive museum, in which the various branches of natural history, &c. are distributed in different apartments: it is extremely rich in native productions, having been considerably augmented with a variety of specimens collected by Pallas, Gmelin, Guldenstaedt, and other learned professors, during their late expeditions through the Russian empire. The stuffed animals and birds occupy one apartment. The chamber of rarities, the cabinet of coins, &c. contain innumerable articles of the highest curiosity and value. The society has this modest motto, *Paulatim*.

The *Academy of Sciences at Bologna*, called the *Institute of Bologna*, was founded by Count Marfigli in 1712, for the cultivating of physics, mathematics, medicine, chemistry, and natural history. Its history is written by

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M. de Limiers, from memoirs furnished by the founder himself.

The *Academy of Sciences at Stockholm*, or *Royal Swedish Academy*, owes its institution to six persons of distinguished learning, amongst whom was the celebrated Linnæus: they originally met on the 2d of June 1739, formed a private society, in which some dissertations were read; and in the latter end of the same year their first publication made its appearance. As the meetings continued and the members increased, the society attracted the notice of the king, and was, on the 31st of March 1741, incorporated under the name of the Royal Swedish Academy. Not receiving any pension from the crown, it is only under the protection of the king, being directed, like our Royal Society, by its own members. It has now a large fund, which has chiefly arisen from legacies and other donations; but a professor of experimental philosophy, and two secretaries, are still the only persons who receive any salaries. Each of the members resident at Stockholm becomes president by rotation, and continues in office during three months. There are two species of members, native and foreign: the election of the former is held in April, and of the latter in July: no money is paid at the time of admission. The dissertations read at each meeting are collected and published four times in the year; they are written in the Swedish language, and printed in octavo; and the annual publications make a volume. The first 40 volumes, which were finished in 1779, are called the Old Transactions; for in the following year the title was changed into that of New Transactions. The king is sometimes present at the ordinary meetings, and particularly at the annual assembly in April for the election of members. Any person who sends a treatise which is thought worthy of being printed, receives the Transactions for that quarter *gratis*, and a silver medal, which is not esteemed for its value, being worth only three shillings, but for its rarity and the honour conveyed by it. All the papers relating to agriculture are published separately under the title of *Oeconomica Acta*. Annual premiums, in money and gold medals, principally for the encouragement of agriculture and inland trade, are also distributed by the academy. The fund for these prizes is supplied from private donations.

The *Royal Academy of Sciences at Copenhagen* owes its institution to the zeal of six literati, whom Christian VI. in 1742, ordered to arrange his cabinet of medals. The count of Holstein was the first president; and the six persons who first formed the design, were John Gram, Joachim Frederic Ramus, Christian Louis Scheid, Mark Woldickej, Eric Pontopidan, and Bernard Moelmann. These persons occasionally meeting for that purpose, extended their designs; associated with them others who were eminent in several branches of science; and forming a kind of literary society, employed themselves in searching into, and explaining the history and antiquities of their country. The count of Holstein warmly patronized this society, and recommended it so strongly to Christian VI. that, in 1743, his Danish majesty took it under his protection, called it the Royal Academy of Sciences, endowed it with a fund, and ordered the members to join to their former pursuits, natural history, physics, and mathematics.

P

Academies. matics. In consequence of the royal favour, the members engaged with fresh zeal in their pursuits; and the academy has published 15 volumes in the Danish language, some of which have been translated into Latin.

The *American Academy of Sciences*, was established in 1780 by the council and house of representatives in the province of Massachusetts Bay, for promoting the knowledge of the antiquities of America, and of the natural history of the country; for determining the uses to which its various natural productions might be applied; for encouraging medicinal discoveries, mathematical disquisitions, philosophical inquiries and experiments, astronomical, meteorological, and geographical observations, and improvements in agriculture, manufactures, and commerce; and, in short, for cultivating every art and science which may tend to advance the interest, honour, dignity, and happiness of a free, independent, and virtuous people. The members of this academy are never to be more than 200, nor less than 40.

Royal Irish Academy arose out of a society established at Dublin, about the year 1782, and consisting of a number of gentlemen, most of whom belonged to the university. They held weekly meetings, and alternately read essays on various subjects. The members of this society afterwards formed a more extensive plan, and admitting only such names as might add dignity to their new institution, became the founders of the *Royal Irish Academy*, which professes to unite the advancement of science with the history of mankind and polite literature. The first volume of their transactions for 1787 appeared in 1788, and seven volumes have been since published. A society was formed in Dublin, similar to the Royal Society in London, as early as the year 1683; but the distracted state of the country was unpropitious to the cultivation of philosophy and literature. The plan was resumed about the beginning of the present century, and the earl of Pembroke, then lord lieutenant, was president of a philosophical society established in Dublin college. In the year 1740, there was instituted a Physico-historical Society; of which two volumes of minutes are extant; but this society soon declined.

VI. *Academies or Schools of Arts*; as that at Petersburg, which was established by the empress Elizabeth, at the suggestion of Count Shuvalof, and annexed to the Academy of Sciences: the fund was 4000*l.* per annum, and the foundation for 40 scholars. The late empress formed it into a separate institution, enlarged the annual revenue to 12,000*l.* and augmented the number of scholars to 300; she also constructed, for the use and accommodation of the members, a large circular building, which fronts the Neva. The scholars are admitted at the age of six, and continue until they have attained that of 18: they are clothed, fed, and lodged, at the expence of the crown. They are all instructed in reading and writing, arithmetic, the French and German languages, and drawing. At the age of 14 they are at liberty to choose any of the following arts, divided into four classes: 1. Painting in all its branches, of history, portraits, battles, and landscapes; architecture; mosaic; enamelling, &c. 2. Engraving on copperplates, seal-cutting, &c. 3. Carving in wood, ivory, and amber. 4. Watch-making, turn-

ing, instrument-making, casting statues in bronze and other metals, imitating gems and medals in paste and other compositions, gilding, and varnishing. Prizes are annually distributed to those who excel in any particular art; and from those who have obtained four prizes, twelve are selected, who are sent abroad at the charge of the empress. A certain sum is paid to defray their travelling expences; and when they are settled in any town, they receive an annual salary of 60*l.* which is continued during four years. There is a small assortment of paintings for the use of the scholars; and those who have made great progress are permitted to copy the pictures in the empress's collection. For the purpose of design, there are models in plaster of the best antique statues in Italy, all done at Rome, of the same size with the originals, which the artists of the academy were employed to cast in bronze.

The *Royal Academy of Arts in London*, was instituted for the encouragement of *Designing, Painting, Sculpture, &c. &c.* in the year 1768. This academy is under the immediate patronage of the king, and under the direction of 40 artists of the first rank in their several professions. It furnishes, in winter, living models of different characters to draw after; and in summer, models of the same kind to paint after. Nine of the ablest academicians are annually elected out of the 40, whose business is to attend by rotation, to set the figures, to examine the performance of the students, and to give them necessary instructions. There are likewise four professors, of *Painting, of Architecture, of Anatomy*, and of *Perspective*, who annually read public lectures on the subjects of their several departments; beside a president, a council, and other officers. The admission to this academy is free to all students properly qualified to reap advantage from the studies cultivated in it; and there is an annual exhibition of paintings, sculptures, and designs, open to all artists of distinguished merit.

The *Academy of Painting and Sculpture at Paris*. This took its rise from the disputes that happened between the master painters and sculptors in that capital; in consequence of which, M. Le Brun, Sarazin, Corneille, and others of the king's painters, formed a design of instituting a particular academy; and, having presented a petition to the king, obtained an arrêt dated January 20. 1648. In the beginning of 1655, they obtained from Cardinal Mazarine a brevet, and letters patent, which were registered in parliament; in gratitude for which favour, they chose the cardinal for their protector, and the chancellor for their vice-protector. In 1663, by means of M. Colbert, they obtained a pension of 4000 livres. The academy consisted of a protector; a vice protector; a director; a chancellor; four rectors; adjuncts to the rectors; a treasurer; four professors, one of which was professor of anatomy, and another of geometry; several adjuncts and counsellors, a historiographer, a secretary, and two ushers.

The Academy of Painting held a public assembly every day for two hours in the afternoon, to which the painters resorted either to design or to paint, and where the sculptors modelled after a naked person. There were 12 professors, each of whom kept the school for a month: and there were 12 adjuncts to supply them in case of need. The professor upon duty placed the naked man

Academies, as he thought proper, and set him in two different attitudes every week. This was what they called *setting the model*. In one week of the month he set two models together, which was called *setting the group*. The paintings, and models made after this model, were called *academies*, or *academy figures*. They had likewise a woman who stood for a model in the public school. Every three months, three prizes for design were distributed among the *elevés* or disciples; two others for painting, and two for sculpture, every year.

There was also an Academy of Painting, Sculpture, &c. at Rome, established by Lewis XIV. wherein those who had gained the annual prize at Paris were entitled to be three years entertained at the king's expence, for their further improvement.

Musical Academy, consists of the managers and directors of the opera.

The *Academy of Ancient Music* was established in London in 1710, by several persons of distinction, and other gentlemen, in conjunction with the most eminent matters of the time, with a view to the study and practice of vocal and instrumental harmony. This institution, which had the advantage of a library, consisting of the most celebrated compositions both foreign and domestic, in manuscript and in print, and which was aided by the performances of the gentlemen of the chapel royal, and the choir of St. Paul's, with the boys belonging to each, continued to flourish for many years.

In 1731, a charge of plagiarism brought against Bononcini, a member of the academy, for claiming a madrigal of Lotti of Venice as his own, threatened the existence of the institution. Dr. Greene, who had introduced the madrigal into the academy, took part with Bononcini, and withdrew from the society, taking with him the boys of St. Paul's. In 1734 Mr. Gates, another member of the society, and master of the children of the royal chapel, retired in disgust; and it was thus deprived of the assistance which the boys afforded it in singing the soprano parts. From this time the academy became a seminary for the instruction of youth in the principles of music, and the laws of harmony. Dr. Pepusch, who was one of its founders, was active in accomplishing this measure; and by the expedients of educating boys for their purpose, and admitting auditor members, the subsistence of the academy was continued. The *Royal Academy of Music* was formed by the principal nobility and gentry of the kingdom for the performance of operas, composed by Mr. Handel, and conducted by him at the theatre in the Haymarket. The subscription amounted to 50,000*l.* and the king, besides subscribing 1000*l.* allowed the society to assume the title of *Royal Academy*. It consisted of a governor, deputy governor, and twenty directors. A contest between Handel and Senesino, one of the performers, in which the directors took the part of the latter, occasioned the dissolution of the academy, after it had subsisted with reputation for more than nine years.

The *Academy of Architecture*, established by M. Colbert in 1671, consisted of a company of skilful architects, under the direction of the superintendent of the buildings.

The *Academy of Dancing*, erected by Lewis XIV. with privileges above all the rest.

VII. *Academies of Law*; as that famous one at *Academies* Beryta, and that of the *Sitientes* at Bologna.

VIII. *Academies of History*: as the *Royal Academy of Portuguese History at Lisbon*. This academy was instituted by King John V. in 1720. It consists of a director, four censors, a secretary, and 50 members; to each of whom is assigned some part of the ecclesiastical or civil history of the nation, which he is to treat either in Latin or Portuguese. In the church-history of each diocese, the prelates, synods, councils, churches, monasteries, academies, persons illustrious for sanctity or learning, places famous for miracles or relics, must be distinctly related in twelve chapters. The civil history comprises the transactions of the kingdom from the government of the Romans down to the present time. The members who reside in the country are obliged to make collections and extracts out of all the registers, &c. where they live. Their meetings to be once in 15 days.

A medal was struck by this academy in honour of their prince: the front of which was his effigy, with the inscription *Johannes V. Lusitanorum Rex*; and, on the reverse, the same prince is represented standing, and raising History almost prostrate before him, with the legend *Historia Resurgit*. Underneath are the following words in abbreviation: REGIA ACADEMIA HISTORIÆ LUSITANÆ, INSTITUTA VI. Idus Decembris MDCCXX.

Academy of Suanian History at Tubingen was lately established by some learned men, for publishing the best historical writings, the lives of the chief historians, and compiling new memoirs on the several points and periods thereof.

IX. *Academies of Antiquities*; as that at Cortona in Italy, and that at Upsal in Sweden. The first is designed for the study of *Hetrurian antiquities*; the other for illustrating the northern languages, and the antiquities of Sweden, in which notable discoveries have been made by it. The head of the *Hetrurian academy* is called *Lucomon*, by which the ancient governors of the country were distinguished. One of their laws is to give audience to poets only one day in the year; another is to fix their sessions, and impose a tax of a dissertation on each member in his turn.

The *Academy of Medals and Inscriptions at Paris* was set on foot by M. Colbert, under the patronage of Lewis XIV. in 1663, for the study and explanation of ancient monuments, and perpetuating great and memorable events, especially those of the French monarchy, by coins, reliefs, inscriptions, &c. The number of members at first was confined to four or five, chosen out of those of the French academy; who met in the library of Mr. Colbert, from whom they received his majesty's orders. The days of their meetings were not determined; but generally they met on Wednesdays, especially in the winter season; but, in 1691, the king having given the inspection of this academy to M. de Pontchartrain comptroller general, &c. he fixed their meetings on Tuesdays and Saturdays.

By a new regulation, dated the 16th of July 1701, the academy was composed of ten *honorary members*; ten *associates*; each of whom had two declarative voices; ten *pensionaries*; and ten *elevés*, or pupils. They then

Academies met every Tuesday and Wednesday, in one of the halls of the Louvre; and had two public meetings yearly, one the day after Martinmas, and the other the 16th after Easter. The class of *elevés* was suppressed, and united to the associates. The king nominated their president and vice-president yearly; but their secretary and treasurer were perpetual. The rest were chosen by the members themselves, agreeably to the constitutions on that behalf given them.

One of the first undertakings of this academy, was to compose, by means of medals, a connected history of the principal events of Louis XIV's reign: but in this design they met with great difficulties, and of consequence it was interrupted for many years; but at length it was completed down to the advancement of the duke of Anjou to the crown of Spain.

In this celebrated work, the establishment of the academy itself was not forgotten. The medal on this subject represents Mercury sitting, and writing with an antique stylus on a table of brass; he leans with his left hand upon an urn full of medals, and at his feet are several others placed upon a card: the legend, *Rerum gestarum fides*; and on the exergue, *Academia regia inscriptionum et numismatum, instituta M.DC.LXIII.* signifying that the Royal Academy of Medals and Inscriptions, founded in 1663, ought to give to future ages a faithful testimony of all great actions. Besides this work, we have several volumes of their memoirs; and their history, written and continued by their secretaries.

X. *Academies of BELLES LETTRES*, are those where in eloquence and poetry are chiefly cultivated. These are very numerous in Italy, and were not uncommon in France.

The *Academy of Umidi at Florence* has contributed greatly to the progress of the sciences by the excellent Italian translations given, by some of its members, of the ancient Greek and Latin historians. Their chief attention is to the Italian poetry, at the same time that they have applied themselves to the polishing of their language, which produced the *Academy della Crusca*.

The *Academy of Humourists, Umoristi*, had its origin at Rome from the marriage of Lorenzo Marcini, a Roman gentleman, at which several persons of rank were guests; and, it being carnival time, to give the ladies some diversion, they took themselves to the reciting of verses, sonnets, speeches, first *extempore*, and afterwards premeditatedly; which gave them the denomination of *Belli Humori*. After some experience, coming more and more into the taste of these exercises, they resolved to form an Academy of belles lettres; and changed the title of *Belli Humori* for that of *Humoristi*: choosing for their device a cloud, which, after being formed of exhalations from the salt waters of the ocean, returns in a gentle sweet shower; with this motto from Lucretius, *Redit agmine dulci*.

In 1690, the *Academy of Arcadi* was established at Rome, for reviving the study of poetry and of the belles lettres. Besides most of the politer wits of both sexes in Italy, this academy comprehends many princes, cardinals, and other ecclesiastics; and, to avoid disputes about pre-eminence, all appear masked after the manner of Arcadian shepherds. Within ten years from its first establishment, the number of *Academies*

demists amounted to six hundred. They hold assemblies seven times a-year in a mead or grove, or in the gardens of some nobleman of distinction. Six of these meetings are employed in the recitation of poems and verses of the Arcadi residing at Rome; who read their own compositions; except ladies and cardinals, who are allowed to employ others. The seventh meeting is set apart for the compositions of foreign or absent members.

This academy is governed by a custos, who represents the whole society, and is chosen every four years, with a power of electing 12 others yearly for his assistance. Under these are two sub-custodes, one vicar or pro-custos, and four deputies or superintendants, annually chosen. The laws of the society are immutable, and bear a near resemblance to the ancient model.

There are five modes of electing members. The first is by *acclamation*. This is used when sovereign princes, cardinals, and ambassadors of kings, desire to be admitted; and the votes are then given *viva voce*. The second is called *annumeration*. This was introduced in favour of ladies and academical colonies, where the votes are taken privately. The third, *representation*, was established in favour of colonies and universities, where the young gentry are bred; who have each a privilege of recommending one or two members privately to be balloted for. The fourth, *surrogation*; whereby new members are substituted in the room of those dead or expelled. The last *destination*; whereby, when there is no vacancy of members, persons of poetical merit have the title of Arcadi conferred upon them till such time as a vacancy shall happen. All the members of this body, at their admission, assume new pastoral names, in imitation of the shepherds of Arcadia. The academy has several colonies of Arcadi in different cities of Italy, who are all regulated after the same manner.

XI. *Academies of LANGUAGES*; called, by some, *Grammatical Academies*: as,

The *Academy della Crusca at Florence*, famous for its vocabulary of the Italian tongue, was formed in 1582, but scarce heard of before the year 1584, when it became noted for a dispute between Tasso and several of its members. Many authors confound this with the Florentine academy. The discourse which Torricelli, the celebrated disciple of Galileo, delivered in the assemblies, concerning levity, the wind, the power of percussion, mathematics, and military architecture, are a proof that these academists applied themselves to things as well as words.

The *Academy of Fruetiferi* had its rise in 1617 at an assembly of several princes and nobility of the country, who met with a design to refine and perfect the German tongue. It flourished long under the direction of princes of the empire, who were always chosen presidents. In 1668, the number of members arose to upwards of 900. It was prior in time to the French academy, which only appeared in 1629, and was not established into an academy before the year 1635. Its history is written in the German tongue by George Neumarck.

The *French Academy*, which had its rise from a meeting of men of letters in the house of M. Conrart, in 1629. In 1635, it was erected into an academy, by Cardinal Richlieu,

Academies Richlieu, for refining and ascertaining the French language and style.—The number of its members was limited to 40; out of whom a director, chancellor, and secretary, were to be chosen: the two former held their posts for two months, the latter was perpetual. The members of this academy enjoyed several privileges and immunities, among which was that of not being obliged to answer before any court but that of the king's household. They met three times a-week in the Louvre; at breaking up, 40 silver medals were distributed among them, having on one side the king of France's head, and on the reverse, *Protecteur de l'Académie*, with laurel, and this motto, *A l'Immortalité*. By this distribution, the attendance of the *Academiſts* was secured: those who were present received the surplus otherwise intended for the absent. To elect or expel a member, at least 18 were required; nor could any be chosen unless he petitioned for it: by this expedient, the affront of refusals from persons elected was avoided. Religious were not admitted; nor could any nobleman, or person of distinction, be admitted on another footing than as a man of letters. None were to be expelled, except for base and dishonest practices; and there were but two instances of such expulsions, the first of M. Granier for refusing to return a deposit, the other of the Abbé Furetiere for plagiarism.—The design of this academy was to give not only rules, but examples, of good writing. They began with making speeches on subjects taken at pleasure, about 20 of which were printed. They met with great opposition from the parliament at their first institution; it being two years before the patents granted by the king could be registered. They have been severely satirized, and their style has been ridiculed as enervating instead of refining the French language. They are also charged with having corrupted the world by flattery, and having exhausted all the topics of panegyric in praise of their founder; it being a duty incumbent on every member, at his admission, to make a speech in praise of the king, the cardinal, the chancellor Seguier, and the person in whose place he is elected. The most remarkable work of this academy is a dictionary of the French tongue; which, after 50 years spent in settling the words and phrases to be used in writing, was at last published in 1694.

The foundation of an *Academy* similar to the above has been proposed at Peterſburg by the learned Princess Dashkof: it is to consist of 60 members. The plan was approved by the late empress, who gave a fund for its support and establishment.

The *Royal Spanish Academy at Madrid* held its first meeting in July 1713, in the palace of its founder, the Duke d'Escalona. It consisted at first of eight academiſts, including the duke; to which number 14 others were afterwards added, the founder being chosen president or director. In 1714, the king granted them his confirmation and protection. Their device is a crucible in the middle of the fire, with this motto, *Limpia, Fija, y da Eſplendor*; "It purifies, fixes, and gives brightness." The number of members is limited to 24; and the Duke d'Escalona to be director for life, but his successors chosen yearly, and the secretary to be perpetual. Their object, as marked out by the royal declaration, was to cultivate and improve the national language: they were to begin with choosing carefully

such words and phrases as have been used by the best Spanish writers; noting the low, barbarous, or obsolete ones; and composing a dictionary wherein they may be distinguished from the former.

XII. Academies of POLITICS; as that at Paris, which consisted of six persons, who met at the Louvre, in the chamber where the papers relating to foreign affairs were lodged. But this academy proved of little service, as the kings of France were unwilling to trust any but their ministers with the inspection of foreign affairs.

For a further account of similar establishments, see the article **SOCIETY**.

ACADEMY is also a term for schools and other seminaries of learning among the Jews, where their rabbins and doctors instructed their youth in the Hebrew language, and explained to them the Talmud and the secrets of the Cabbala: Those of Tiberias and Babylon have been the most noted.

The Romans had a kind of military academies, established in all the cities of Italy, under the name of *Campi Martis*. Here the youth were admitted to be trained for war at the public expence. The Greeks, beside academies of this kind, had military professors called *Taſſici*, who taught all the higher offices of war, &c. &c.

ACADEMY is often used with us to denote a kind of collegiate seminary, where youth are instructed in arts and sciences. There is one at Portsmouth for teaching navigation, drawing, &c. which was founded by George I. in 1722; another at Woolwich, for fortification, gunnery, &c.; established by George II. in 1741.—Beside these, there are numerous academies, especially in London, for teaching mathematics, languages, writing, accounts, drawing, and other branches of learning.

The nonconformist ministers, &c. are bred up in private academies; as not approving the common university education. There are several academies of this description in different parts of England.

ACADEMY is likewise a name given to a riding-school, where young gentlemen are taught to ride the great horse, &c. and the ground allotted is usually called the *Manege*.

ACADEMY Figure, a drawing of a naked man or woman, taken from the life; which is usually done on paper with red or black chalk, and sometimes with pastils or CRAYONS.

ACADIE, or **ACADY**, in *Geography*, a name formerly given to Nova Scotia, or New Scotland, in America. See *NOVA SCOTIA*.

ACÆNA, in *Antiquity*, a Grecian measure of length, being a ten-foot rod, used in measuring their lands.

ACÆNA, in *Botany*. See **BOTANY INDEX**.

ACAJOU, or **CASHEW-NUT TREE**. See **ANACARDIUM**, **BOTANY INDEX**.

ACALANDRUS, a river falling into the bay of Tarentum, not far from the Metapontum (Pliny, Strabo); now called *Fiume de Roseto*.

CALEPTIC, in ancient prosody, a complete verse.

ACALYPHA, the **THREE-SEEDED MERCURY**. See **BOTANY INDEX**.

ACALZIKE, a town and fortress of Asiatic Tartary, situated in N. Lat. 41. 30. E. Long. 44. 14.
ACAMANTIS

Academy
Acalzike.

Acamantis
||
Acapulco.

ACAMANTIS, the ancient name of the island of Cyprus, taken from one of its promontories situated to the west, and called *Acamas*. Teos in Ionia was also called thus from *Acamas* the founder.

ACAMAS, ACAMANTIS, in *Ancient Geography*, the west promontory of the island of Cyprus, from whence it took its ancient name; now Cape *Pisano*, or *Episano*, where formerly was a town of the same name, now a village called *Crusocco*.

ACAMAS, son of Theseus, followed the rest of the Grecian princes to the siege of Troy; and was deputed, with Diomedes, to the Trojans, in order to get Helen restored. Laodice, Priam's daughter, fell in love with him, stole a night with him, and had a son by him called *Munitus*. He was one of the heroes who concealed themselves in the wooden horse. One of the tribes of Athens was called *Acamantides* from him, by the appointment of the oracle; and he founded a city in Phrygia Major, called *Acamantium*. Homer mentions two other heroes of this name; one a Thracian prince who came to succour Priam, another a son of Antenor.

ACANGIS, that is, *Ravagers* or *Adventurers*; a name which the Turks give their hussars or light troops, who are generally sent out in detachments to procure intelligence, harass the enemy, or ravage the country.

ACANTHA, in *Botany*, the prickle of any plant; in *Zoology*, a term for the spine or prickly fins of fishes.

ACANTHABOLUS, in *Surgery*, an instrument for pulling thorns, or the like, out of the skin.

ACANTHINE, any thing resembling or belonging to the herb acanthus. Acanthine garments, among the ancients, are said to be made of the down of thistles; others think they were garments embroidered in imitation of the acanthus.

ACANTHOPTERYGIUS FISHES, a term used by Linnaeus and others for those fishes whose back fins are hard, osseous, and prickly.

ACANTHOS, ACANTHUS, a town of Egypt, near Memphis, (Pliny); now *Bisaha*. Also a maritime town of Macedonia, to the west of Mount Athos; a colony of Andrians (Thucydides, Ptolemy); now *Eriffo*; near which was shown Xerxes's ditch, of seven stadia, in order to separate Mount Athos from the continent, and convey his ships, without doubling Athos, into the Singitic bay. *Acanthos* is also a town of Epirus.

ACANTHUS, BEAR'S BREECH, in *Botany*. See *BOTANY Index*.

ACANTHUS, in *Architecture*, an ornament representing the leaves of the acanthus, used in the capitals of the Corinthian and Composite orders.

ACAPALA, or ACAPULA, a town in the province of Chiapa, in New Spain, which is situated on Tabasco river, about five leagues north-west from Chiapa.

ACAPAM, a town of Asia on the Euxine sea.

ACAPULCO, a considerable town and port in Mexico, on a bay of the South sea, distant from the city of Mexico south-east 210 miles. It has a fine harbour, from whence a ship annually sails to Manilla in the Philippine islands, near the coast of China in Asia; and another returns annually from thence with all the

treasures of the East Indies, such as diamonds, rubies, sapphires, and other precious stones; the rich carpets of Persia; the camphire of Borneo; the benjamin and ivory of Pegu and Cambodia; the silks, muslins, and calicoes, of the Mogul's country; the gold dust, tea, china ware, silk, and cabinets, of China and Japan; besides cinnamon, cloves, mace, nutmegs, and pepper; infomuch that this single ship contains more riches than many whole fleets. The goods brought to Acapulco are carried to the city of Mexico by mules and pack horses; and from thence to Vera Cruz on the North sea, in order to be shipped for Europe. Acapulco itself is a small place, consisting of about 200 or 300 thatched houses. Ships arrive at the port by two inlets, separated from each other by a small island; the entrance into them in the day time is by means of a sea breeze, as the sailing out in the night time is effected by a land breeze. A wretched fort, 42 pieces of cannon, and a garrison of 60 men, defend it. It is equally extensive, safe, and commodious. The basin which constitutes this harbour is surrounded by lofty mountains, which are so dry, that they are even destitute of water. The air here is hot, heavy, and unwholesome; to which none can habituate themselves, except certain negroes that are born under a similar climate, or some mulattoes. This feeble and miserable colony is crowded with a vast accession to its numbers upon the arrival of the galleons; and traders flocking here from all the provinces of Mexico, who come to exchange European toys, their own cochineal, and about ten millions of silver (437,500l. Sterling) for spices, muslins, printed linens, silk, perfumes, and the gold works of Asia. W. Long. 102. 20. N. Lat. 17. 22.

ACARAI, a town of Paraguay in South America, built by the Jesuits in 1624. W. Long. 51. 5. S. Lat. 26.

ACARAUNA, a small American fish, called by our sailors *the old wife*. See *LABRUS, ICHTHYOLOGY Index*.

ACARI, PORT, in *Geography*, lies on the coast of Peru, in S. Lat. 15. 50. W. Long. 54. 40.

ACARNANIA, the first country of Free Greece, or Greece Proper, bounded on the west by the Sinus Ambracius, and separated from Aetolia by the river Achelous on the east, and by the Sinus Ambracius from Epirus. The people were called *Acarnanes*, denoting persons unshorn; other Etolians, to the east of the Achelous, being called *Curetes* (Homer) from being shorn. According to Lucian, they were noted for effeminacy and incontinence; hence the proverb *Porcellus Acarnanius*. This country was famous for an excellent breed of horses; so that *Ακαρνικός ἵππος*, is a proverbial saying for a thing excellent in its kind. It is now called *la Carnia* and *il Despotato*.

ACARON, or ACCARON, a town of Palestine, called *Ekron* in Scripture. It was the boundary of the Philistines to the north; stood at some distance from the sea, near Bethhemesh; and was famous for the idol of Baalzebub.

ACARUS, the TICK or MITE. See *ENTOMOLOGY Index*.

ACASTUS, in *Classic History*, the son of Pelias king of Thessaly, and one of the most famous hunters of his time, married Hippolita, who falling desperately

Acari
||
Acastus.

Acatalectic in love with Peleus her son-in-law, and he refusing to gratify her wishes, she accused him to her husband of a rape: on which he slew them both.

ACATALECTIC, a term in *Ancient Poetry* for such verses as have all their feet or syllables, in contradistinction to those that have a syllable too few. The first verse of the two following from Horace is *acatalectic* or complete, the last is *catalectic* or deficient.

*Solvitur acris hyems, grata vice veris et Favoni:
Trabantque siccas machinæ carinas—*

ACATALEPSY, signifies the impossibility of comprehending something. The distinguishing tenet of the Pyrrhonists was their asserting an absolute acatalepsy in regard to every thing.

ACATERY, or ACCATRY, anciently an officer of the king's household, designed for a check betwixt the clerks of the kitchen and the purveyors.

ACATHARSIA, in *Medicine*, an impurity of the blood or humours.

ACATHISTUS, the name of a solemn hymn or vigil, anciently sung in the Greek church on the Saturday of the fifth week of Lent, in honour of the Virgin, for having thrice delivered Constantinople from the invasions of the barbarous nations. It was denominated *ακαθιστος*, i. e. *without sitting*, because, in the celebration of the praises of the virgin, the people stood all night singing.

ACATIUM, in *Ancient Navigation*, a kind of boat or pinnace used for military purposes. The *acatium* was a species of those vessels called *naves actuariae*, i. e. such as were wrought with oars. It was sometimes made use of in battle. Strabo describes it as a privateer or pirate sloop, and Suidas, as a fishing vessel.

ACAULIS, in *Botany*, a term applied to certain plants, the flowers of which have no pedicle or stalk to support them, but rest immediately on the ground, such as the carline thistle, &c.

ACCA, SAINT, bishop of Hagustaldt, or Hexham, in Northumberland, succeeded Wilfrid in that see in 709. He ornamented his cathedral in a most magnificent manner; furnished it with plate and holy vestments; and erected a noble library, consisting chiefly of ecclesiastical learning, and a large collection of the lives of the saints, which he was at great pains to procure. He was accounted a very able divine, and was famous for his skill in church music. He wrote several books: particularly, *Passiones Sanctorum*, The Sufferings of the Saints: *Pro illustrandis scripturis, ad Bedam*, For explaining the scriptures, addressed to Bede. He died in 740, having enjoyed the see of Hexham 31 years, under Egbert king of the Northumbrians.

ACCALIA, in *Roman Antiquity*, solemn festivals held in honour of Acca Laurentia, Romulus's nurse: they were otherwise called LAURENTALIA.

ACCAPITARE, in *Law*, the act of becoming vassal of a lord, or of yielding him homage and obedience. Hence,

ACCAPITUM signifies the money paid by a vassal upon his admission to a feu.

ACCAPITUM, in our *Ancient Law*, was used also to express the relief due to the chief lord. See RELIEF.

ACCEDAS AD CURIAM, in *English Law*, a writ lying where a man has received, or fears, false judg-

ment in an inferior court. It lies also for justice delayed, and is a species of the writ RECORDARE.

ACCELERATION, in *Mechanics*, the increase of velocity in a moving body. Accelerated motion is that which continually receives fresh accessions of velocity. Acceleration stands directly opposed to retardation, which denotes a diminution of velocity.

ACCELERATION is chiefly used, in *Physics*, in respect of falling bodies, i. e. of heavy bodies tending towards the centre of the earth by the force of gravity. That natural bodies are accelerated in their descent, is evident from various considerations, both *à priori* and *posteriori*.—Thus, we actually find, that the greater height a body falls from, the greater impression it makes, and the more vehemently does it strike the subject, plane, or other obstacle.

Various were the systems and opinions which philosophers produced to account for this acceleration. But the immediate cause of acceleration is now sufficiently obvious; the principle of gravitation, which determines the body to descend, determining it to be accelerated by a necessary consequence.

Suppose a body let fall from on high: the primary cause of its beginning to descend is doubtless the power of gravity; but when once the descent is commenced, that state becomes in some measure natural to the body; so that if left to itself, it would persevere in it for ever, even though the first cause should cease: as we see in a stone cast with the hand, which continues to move after it is left by the cause that gave it motion. But, beside the propensity to descend impressed by the first cause, and which of itself were sufficient to continue the same degree of motion, once begun, *in infinitum*; there is a constant accession of subsequent efforts of the same principle, gravity, which continues to act on the body already in motion, in the same manner as if it were at rest. Here, then, being a double cause of motion; and both acting in the same direction, viz. directly towards the centre of the earth; the motion they jointly produce must necessarily be greater than that of any one of them.—And the velocity thus increased having the same cause of increase still persisting, the descent must necessarily be continually accelerated.

The motion of a body ascending, or impelled upwards, is diminished or retarded from the same principle of gravity acting in a contrary direction, in the same manner as a falling body is accelerated: See RETARDATION. A body thus projected upwards, rises till it has lost all its motion: which it does in the same time that a body falling would have acquired a velocity equal to that wherewith the body was thrown up. Hence the same body thrown up, will rise to the same height from which falling it would have acquired the velocity wherewith it was thrown up: and hence the heights which bodies thrown up with different velocities do ascend to, are to one another as the squares of these velocities.

ACCELERATION of Bodies on inclined Planes. The same general law obtains here as in bodies falling perpendicularly: the effect of the plane is to make the motion slower; but the inclination being everywhere equal, the retardation arising therefrom will proceed equally in all parts, at the beginning and the ending of the motion. See MECHANICS.

ACCELERATION

Acceler-
tion.

Acceler-
tion.

ACCELERATION of the Motion of Pendulums.—The motion of pendulous bodies is accelerated in their descent; but in a less ratio than that of bodies falling perpendicularly. See MECHANICS and PENDULUM.

ACCELERATION of the Motion of Projectiles. See PROJECTILES.

ACCELERATION is also applied in the ancient astronomy, in respect of the fixed stars. This acceleration was the difference between the revolution of the *primum mobile* and the solar revolution; which was computed at 3 minutes and 56 seconds.

ACCELERATION of the Moon, a term used to express the increase of the moon's mean motion from the sun, compared with the diurnal motion of the earth; so that it is now a little swifter than it was formerly. Dr Halley was the first who made this discovery; and he was led to it by comparing the ancient eclipses observed at Babylon with those observed by Albatennius in the ninth century, and some of his own time. He was not able to ascertain the quantity of this acceleration, because the longitudes of Bagdad, Alexandria, and Aleppo, where the observations were made, had not been accurately determined. But since his time, the longitude of Alexandria has been ascertained by Chazelles; and Babylon, according to Ptolemy's account, lies 50' east from Alexandria. From these data, Mr Dunthorn compared several ancient and modern eclipses, with the calculations of them, by his own tables, and hereby verified Dr Halley's opinion; for he found that the same tables represent the moon's place more backward than her true place in ancient eclipses, and more forward than her true place in later eclipses; and thence justly inferred, that her motion in ancient times was slower, in later times quicker, than the tables give it. But he did not content himself with merely ascertaining the fact; he proceeded to determine the quantity of the acceleration; and by means of the most ancient eclipse of which any authentic account remains, observed at Babylon in the year before Christ 721, he concluded, that the observed beginning of this eclipse was not above an hour and three quarters before the beginning by the tables; and therefore the moon's true place could precede her place by computation but little more than 50' of a degree at that time. Admitting the acceleration to be uniform, and the aggregate of it as the square of the time, it will be at the rate of about 10' in 100 years.

Dr Long attributes the acceleration above described to one or more of these causes: either, 1. The annual and diurnal motion of the earth continuing the same, the moon is really carried round the earth with a greater velocity than heretofore: or, 2. The diurnal motion of the earth, and the periodical revolution of the moon, continuing the same, the annual motion of the earth round the sun is a little retarded; which makes the sun's apparent motion in the ecliptic a little slower than formerly; and, consequently, the moon in passing from any conjunction with the sun, spends less time before she again overtakes the sun, and forms a subsequent conjunction: in both these cases, the motion of the moon from the sun is really accelerated, and the synodical month actually shortened. Or, 3. The annual motion of the earth, and the periodical revolution of the moon continuing the same, the rotation of the earth round its axis is a little retarded: in this case,

days, hours, minutes, seconds, &c. by which all periods of time must be measured, are of a longer duration; and consequently the synodical month will appear to be shortened, though it really contains the same quantity of absolute time as it always did. If the quantity of matter in the body of the sun be lessened by the particles of light continually streaming from it, the motion of the earth round the sun may become slower: if the earth increases in bulk, the motion of the moon round the earth may be quickened thereby. See ASTRONOMY.

ACCELERATION of a Planet. A planet is said to be accelerated in its motion when the real diurnal motion exceeds the mean diurnal motion. On the other hand, a planet is said to be retarded in its motion when the mean motion exceeds the real diurnal motion. This inequality arises from the change in the distance of the planet from the sun, which is continually varying; the planet moving always quicker in its orbit when nearer the sun, and slower when farther off.

ACCELERATOR, in *Anatomy*, the name of two muscles of the penis, which serve for ejecting the urine or semen. See ANATOMY, *Table of the Muscles*.

ACCENDENTES, a lower order of ministers in the Romish church, whose office is to light and trim the candles.

ACCENDONES, in *Roman Antiquity*, a kind of gladiators, whose office was to excite and animate the combatants during the engagement. The orthography of the word is contested: the first edition of Tertullian, by Rhenanus, has it *accedones*; an ancient manuscript, *accendones*. Aquinas adheres to the former, Pitiscus to the latter. The origin of the word, supposing it *accendones*, is from *accendo*, I kindle; supposing it *accedones*, from *accedo*, I accede, am added to. The former places their distinguishing character in enlivening the combat by their exhortations and suggestions: the latter supposes them to be much the same with what among us are called *seconds*, among the Italians *patroni*; excepting that these latter only stand by to see the laws of the sword duly observed, without intermeddling to give advice or instruction.

ACCENSI, in the Roman armies, certain supernumerary soldiers, designed to supply the places of those who should be killed or anywise disabled. They were thus denominated, *quia accensebantur*, or *ad censum adiciebantur*. Vegetius calls them *supernumerarii legionum*. Cato calls them *ferentarii*, in regard they furnished those engaged in battle with weapons, drink, &c. Though Nonnius suggests another reason of that appellation, viz. because they fought with stones, slings, and weapons *quæ feruntur*, such as are thrown, not carried in the hand. They were sometimes also called *velites*, and *velati*, because they fought clothed, but not in armour; sometimes *adscriptitii*, and *adscriptivi*; sometimes *rorarii*. The *accensi*, Livy observes, were placed at the rear of the army, because no great matter was expected from them; they were taken out of the fifth class of citizens.

ACCENSI, in *Antiquity*, denotes an inferior order of officers, appointed to attend the Roman magistrates, somewhat in the manner of ushers, serjeants, or tipstaves among us. They were thus called from *accire*, to send for; one part of their office being to call assemblies of

Acceler-
tion
||
Accensi.

Accent of the people, summon parties to appear and answer before the judges, &c.

Accent.

ACCENSUS was also an appellation given to a kind of adjutants, appointed by the tribune to assist each centurion and decurion. In which sense *accensus* is synonymous with *optio*. In an ancient inscription, given by Torre, we meet with ACCENSUS EQUIUM ROMANORUM; an office nowhere else heard of. That author suspects it for a corruption; and instead thereof reads, A CENSIBUS.

ACCENSION, the action of setting a body on fire: thus the accension of tinder is effected by striking fire with flint and steel.

ACCENT, in reading or speaking, an inflection of the voice, which gives to each syllable of a word its due pitch in respect of height or lowness. See READING. The word is originally Latin, *accentus*; a compound of *ad*, to; and *cano*, to sing. *Accentus*, quasi *ad-cantus*, or *iuxta cantum*. In this sense, accent is synonymous with the Greek *ῥωσις*; the Latin *tenor*, or *tonor*; and the Hebrew *עָוָה*, *gufus*, taste.—For the doctrine of Accents in Composition see POETRY, Part III.

ACCENT, among Grammarians, is a certain mark or character placed over a syllable to direct the stress of its pronunciation. We generally reckon three grammatical accents in ordinary use, all borrowed from the Greeks, viz. the acute accent, (´), which shows when the tone of the voice is to be raised. The grave accent (`), when the note or tone of the voice is to be depressed. The circumflex accent, (ˆ), is composed of both the acute and the grave, and points out a kind of undulation of the voice. The Latins have made the same use of these three accents.

The Hebrews have a grammatical, a rhetorical, and musical accent: though the first and last seem, in effect, to be the same; both being comprised under the general name of *tonic accents*, because they give the proper tone to syllables; as the rhetorical accents are said to be euphonic, because they tend to make the pronunciation more sweet and agreeable. There are four euphonic accents, and 25 tonic; of which some are placed above, and others below the syllables; as the Hebrew accents serving not only to regulate the risings and fallings of the voice, but also to distinguish the sections, periods, and members of periods, in a discourse; and to answer the same purposes with the points in other languages. Their accents are divided into *emphorics*, *kings*, *dukes*, &c. each bearing a title answerable to the importance of the distinction it makes. Their emperor rules over a whole phrase, and terminates the sense completely; answering to our point. Their king answers to our colon; and their duke to our comma. The king, however, occasionally becomes a duke, and the duke a king, as the phrases are more or less short. It must be noted, by the way, that the management and combination of these accents differ in Hebrew poetry from what they are in prose. The use of the tonic or grammatical accents has been much controverted; some holding that they distinguish the sense; while others maintain that they are only intended to regulate the music, or singing; alleging that the Jews sing, rather than read, the Scriptures in their Synagogues*. Be this, however, as it will, it is certain the ancient Hebrews were not acquainted with these accents. The opinion which prevails amongst the learned is, that

they were invented about the sixth century, by the Jewish doctors of the school of Tiberias, called the *Massefrets*.

As to the Greek accents, now seen both in manuscripts and printed books, there has no less dispute about their antiquity and use than about those of the Hebrews. Isaac Vossius endeavours to prove them of modern invention; asserting, that antiently they had nothing of this kind, but only a few notes in their poetry, which were invented by Aristophanes the grammarian, about the time of Ptolemy Philopater; and that these were of musical, rather than grammatical use, serving as aids in the singing of their poems, and very different from those introduced afterwards. He also shows from several ancient grammarians, that the manner of writing the Greek accents in these days was quite different from that which appears in our books. The author of *La Methode Greque*, p. 546, observes, that the right pronunciation of the Greek language being natural to the Greeks, it was needless for them to mark it by accents in their writings: so that, according to all appearance, they only began to make use of them about the time when the Romans, wishing to learn the Greek tongue, sent their children to study at Athens, thinking thereby to fix the pronunciation, and to facilitate it to strangers; which happened, as the same author observes, a little before Cicero's time. Wettstein, Greek professor at Basil, in a learned dissertation, endeavours to prove the Greek accents of an older standing. He owns that they were not always formed in the same manner by the ancients; but thinks that difference owing to the different pronunciation which obtained in the different parts of Greece. He brings several reasons, *a priori*, for the use of accents, even in the earliest days: as that they then wrote all in capital letters equidistant from each other, without any distinction either of words or phrases, which without accents could scarce be intelligible; and that accents were necessary to distinguish ambiguous words, and to point out their proper meaning: which he confirms from a dispute on a passage in Homer, mentioned by Aristotle in his *Poetics*, chap. v. Accordingly, he observes, that the Syrians, who have tonic, but no distinctive accents, have yet invented certain points, placed either below or above the words, to show their mood, tense, person, or sense.

Mr Browne of Trinity, College Dublin, has entered more deeply into this investigation; and as he had an opportunity of conversing with the crew of a Greek ship from Patras, a town situated not far distant from the ancient Corinth, which had been driven by stress of weather into the port of Dingle in Ireland, the result of his inquiries was, that the practice of the modern Greeks is different from any of the theories that have been delivered in books. "It is true, he observes, they have not two pronunciations for prose and for verse, and in both they read by accent, but they make accent the cause of quantity; they make it govern and controul quantity; they make the syllable long on which the acute accent falls, and they allow the acute accent to change the real quantity. They always read poetry as well as prose by accent. Whether any inference can hence be drawn as to the pronunciation of the ancients, I must leave, after what I have premised above, to men of more learning, but I think it at least so probable as to make it worth while to mention the instances

* Cooper
Dom. Mo-
Jaic. Clav.
p. 31.

Accent.

instances which occurred in proof of this assertion more particularly. Of the two first persons whom I met, one, the steward of the ship, an inhabitant of the island of Cephalonia, had had a school education: he read Euripides and translated some easier passages without much difficulty. By a stay in this country of near two years he was able to speak English very tolerably, as could the captain and several of the crew; and almost all of them spoke Italian fluently. The companion however of the steward could speak only modern Greek, in which I could discover that he was giving a description of the distress in which the ship had been, and though not able to understand the context I could plainly distinguish many words, such as *δένδρεα*—*ξύλον*, and amongst the rest the sound of *Ανθρώπος* pronounced short; this awoke my curiosity, which was still more heightened when I observed that he said *Ανθρώπων* long, with the same attention to the alteration of the accent with the variety of case, which a boy would be taught to pay at a school in England. Watching therefore more closely, and asking the other to read some ancient Greek, I found that they both uniformly pronounced according to accent, without any attention to long or short syllables where accent came in the way; and on their departure, one of them having bade me good day, by saying *Καλημέρα*, to which I answered *Καλημέρα*, he with strong marks of reprobation set me right, and repeated *Καλημέρα*; and with like censure did the captain upon another occasion observe upon my saying *Σοκράτες* instead of *Σοκράτης*.

“I now had a strong wish to know whether they observed the distinction in this respect usually between verse and prose, but from the little scholarship of the two men with whom I had conversed, from the ignorance of a third whom I afterwards met, (who however read Lucian with ease, though he did not seem ever to have heard of the book), and on account of my imperfect mode of conversing with them all, I had little hopes of satisfaction on the point, nor was I clear that they perfectly knew the difference between verse and prose. At length having met with the commander of the ship, and his clerk Athanasius *Κόνομος*, and finding that the latter had been a schoolmaster in the Morea, and had here learnt to speak English fluently, I put the question to them in the presence of a very learned college friend, and at another time, to avoid any error, with the aid of a gentleman who is perfectly master of the Italian language. Both the Greeks repeatedly assured us that verse as well as prose was read by accent, and not by quantity, and exemplified it by reading several lines of Homer, with whose name they seemed perfectly well acquainted.

“I shall give an instance or two of their mode of reading:

Βῆ δ' ἀκίαν παρὰ θῖνα πολυφλοίσβοιο θαλάσσης,
 Τὸν δ' ἀπμμιβόροενος προσέφη πόδας ἀκὺς Ἀχιλλεύς,
 Ἔς δ' ἔρετας ἐπίηδὲς ἀγείρομεν, ἐς δ' ἐκατόμβην.

They made the *ε* in *ἀκίαν*, *προσέφη*, and *ἔρετας* long.

But when they read

Κλυθί μιν, Ἀρξυρότοξ', ὅς Χρύσην ἀμφιβέβηκας,

they made the second syllable of the first word *Κλυθί* short, notwithstanding the acute accent: on my asking

why, they desired me to look back on the circumflex on the first syllable, and said it thence necessarily followed; for it is impossible to pronounce the first syllable with the great length which the circumflex denotes and not to shorten the second. The testimony of the schoolmaster might be vitiated, but what could be stronger, than that of these ignorant mariners as to the vulgar common practice of modern Greece; and it is remarkable that this confirms the opinion of Bishop Horsley, that the tones of words in connexion are not always the same with the tones of solitary words, though in those of more than one syllable the accentual marks do not change their position. I must here add that these men confirmed an observation which I have heard made, that we are much mistaken in our idea of the supposed lofty sound of *πολυφλοίσβοιο θαλάσσης*; that the borderers on the coast of the Archipelago take their ideas from the gentle laving of the shore by a summer wave, and not from the roaring of a winter ocean, and they accordingly pronounced it *Polyphlissio thalassēs*.

“I own that the observations made by me on the pronunciation of these modern Greeks brought a perfectly new train of ideas into my mind. I propose them, with humility, for the consideration of the learned; but they have made a strong impression upon me, and approached, when compared with other admitted facts, nearly to conviction. In short, I am strongly inclined to believe, that what the famous treatise so often mentioned on the profodies of the Greek and Latin languages mentions as the peculiarity of the English, that we always prolong the sound of the syllable on which the acute accent falls, is true, and has been true of every nation upon earth. We know it is true of the modern Italians—they read Latin in that respect just as we do, and say, *Arma virūmq̄e cānō*, and, *In nōvā fert animus*, as much as we. And when we find the modern Greeks following the same practice, surely we have some cause to suppose that the ancients did the same. In the English language, indeed, quantity is not affected, because accent and quantity always agree. Bishop Horsley endeavoured to prove that they did so in Greek, but this is on the bold supposition that the accent doth not fall where the mark is placed. The objection to this hypothesis, which seems to have been admitted by all writers, and considered as decisive by some as to prose, by all as to verse, is that such a mode of pronunciation or reading must destroy metre, or *rhythmos*. From this position, however universal, or however it may have been taken for granted, I totally dissent. That it will oppose the metre or quantity I readily agree, but that it will destroy the *rhythmos*, by which, whatever learned descriptions there may have been of its meaning, I understand nothing more than the melody or smooth flowing of the verses, or their harmony if you please, if harmony be properly applied to successive and not synchronous sounds. On the contrary, nothing can be more disagreeable or unmelodious than the reading verse by quantity, or scanning of it, as it is vulgarly called. Let us try the line so often quoted—

Arma virūmq̄e cānō, Trōjā qui primū ab ōris,

instead of

Arma virūmq̄e cānō, Trōjā q̄i primū ab ōris.

“No

Accent.

Accent.

"No man ever defined Rhythmos better than Plato, *ordinem quandam qui in motibus cernitur*; the motion or measure of the verse may be exact, and yet the order, arrangement, and disposition of the letters and syllables, such as to be grating and unmelodious to the ear. In like manner the feet of the verse may be exact, but the stress laid upon particular syllables of it which follows the quantity may totally destroy the melody: in short, the radical error seems to be the confusion of quantity with melody, and the supposition that whatever is at war with quantity and metre must be at war with melody.

"It will be asked then what is the use of metre or measure in verse, if we are not to read by it; and here is the grand difficulty, and I own with candour I cannot answer it with perfect satisfaction to my own mind: to those indeed who say we are to read by accent in prose, it may be equally asked what is the use of long or short syllables in prose, if we are not to attend to them when accent comes in the way: but to those who think otherwise, I can only answer, that in the first place accent doth not always interfere, and then quantity is our guide, and accent often accords with quantity. Secondly, Metre determines the number of feet or measures in each verse, and thereby produces a general analogy and harmony through the whole; and it is to be observed, that, as I apprehend, accent doth not change the number of feet, though it doth the nature or species of them. Thus when we read

Arma virumque cāno, Trōjæ qui primus ab oris,

we do not make more feet than when we scan the line, nor employ more time than in pronouncing the next line in which the accent happens to accord with the quantity, viz.

Italiam fato profugus, Lavinaque venit.

Thirdly, The poet in measuring his verse certainly must be confined to some certain number and order of long and short syllables, in order to produce a concordance through the whole, and even to regulate the position of accent, which though not subdued by quantity will certainly have some relation to it, *euphoniæ gratia*; but surely the length or shortness of a syllable cannot determine where emphasis shall be placed—that must depend on the meaning and the thought; and it would be most absurd for the poet to say to the reader, you shall not rest upon this emphatic and significative word because its syllables are short, and wherever there is a rest, there must be length and intonation." (*Irisb. Transf.* vol. vii.)

The use of accents, to prevent ambiguities, is most remarkably perceived in some eastern languages, particularly the Siamese and Chinese. Among the people of China, every word, or (which is the same thing) syllable, admits of five accents, as spoken more acutely or remissly; and thus stands for many different things. The same sound *ya*, according to the accent affixed to it, signifies *God, a wall, excellent, stupidity, and a goose*. The Chinese have but 330 spoken words in their language; but these being multiplied by the different accents or tones, which affect the vowels, furnish a language tolerably copious. By means hereof, their 330 simple sounds come to denote 1650 things; but this being hardly sufficient, they are increased further by

aspirates added to each word to double the number. The Chinese only reckon four accents: for which the missionaries use the following marks, *áá, á, à, ã*; to which they have added a fifth, thus, *z̄*. They make a kind of modulation; wherein, prolonging the duration of the sound of the vowel, they vary the tone, raising and sinking it by a certain pitch of voice: so that their talking is a sort of music or singing. Attempts have been made to determine the quantity of the rise or fall in each accent by means of musical notes; but this is hard to effect, as being different in different persons. Hence the great difficulty of the language to foreigners; they are forced to sing most scrupulously: if they deviate ever so little from the accent, they say quite a different thing from what was intended. Thus, meaning to compliment the person you are talking to with the title *Sir*, you call him a beast with the same word, only a little varied in the tone. Magalhon makes the language the easier to learn on this account. The Siamese are also observed to sing rather than talk. Their alphabet begins with six characters, all only equivalent to a K, but differently accented. For though in the pronunciation the accents are naturally on the vowels, yet they have some to diversify such of their consonants as are in other respects the same.

ACCENT, in *Music*, is a certain enforcement of particular sounds, whether by the voice or instruments, generally used at the beginning of bars.

ACCEPTANCE, in *Law*, a person's agreeing to offers made in bargaining, by which the bargain is concluded.

ACCEPTANCE, in the *Church of Rome*, is put for receiving the pope's constitutions.

ACCEPTANCE, in *Commerce*, is the subscribing, signing, and making one's self debtor for the sum contained in a bill of exchange or other obligation.

ACCEPTATION, in *Grammar*, the sense or meaning in which any word is taken.

ACCEPTER, or ACCEPTOR, the person who accepts a BILL of exchange, &c.

ACCEPTILATION, among *Civilians*, an acquittance or discharge given by the creditor to the debtor without the payment of any value.

ACCESSIBLE, something that may be approached, or that access may be had to. Thus we say, Such a place is accessible on one side, &c.

ACCESSION, in *Law*, is a method of acquiring property, by which, in things that have a close connection or dependence upon one another, the property of the principal thing draws after it the property of the accessory: Thus, the owner of a cow becomes likewise the owner of the calf. It sometimes likewise signifies consent or acquiescence.

ACCESSION, among *Physicians*, is used for a paroxysm of a disease; among politicians, it signifies a prince's succeeding to the government upon the death of his predecessor.

ACCESSORY, or ACCESSARY, something that accedes, or is added to another more considerable thing; in which sense the word stands opposed to PRINCIPAL.

ACCESSORY, or *Accessory*, in *Common Law*, is chiefly used for a person guilty of a felonious offence, not principally, but by participation: as by advice, command, or concealment.

There are two kinds of accessories: before the fact, and

Accent
||
Accessory.

Accessory and *after* it. The *first* is he who commands, or procures another to commit felony, and is not present himself; for if he be present, he is a principal. The *second* is he who receives, assists, or comforts any man that has done murder or felony, whereof he has knowledge. A man may also be accessory to an accessory, by aiding, receiving, &c. an accessory in felony.

An accessory in felony shall have judgment of life and member, as well as the principal who did the felony; but not till the principal be first attainted, and convicted, or outlawed thereon. Where the principal is pardoned without attainder, the accessory cannot be arraigned; it being a maxim in law, *Ubi non est principalis, non potest esse accessorius*: but if the principal be pardoned, or have his clergy after attainder, the accessory shall be arraigned; 4 and 5 W. et M. cap. 4. And by stat. 1 Anne, cap. 9. it is enacted, that where the principal is convicted of felony or stands mute, or challenges above 20 of the jury, it shall be lawful to proceed against the accessory in the same manner as if the principal had been attainted; and notwithstanding such principal shall be admitted to his clergy, pardoned, or delivered before attainder. In some cases also, if the principal cannot be taken, then the accessory may be prosecuted for a misdemeanour, and punished by fine, imprisonment, &c. In the lowest and highest offences there are no accessories, but all are principals: as in riots, routs, forcible entries, and other trespasses, which are the lowest offences. So also in the highest offence, which is, according to the English law, high treason, there are no accessories.

Accessories, in petty treason, murder, and in felonies of several kinds, are not to have their clergy. There can be no accessory before the fact in manslaughter; because that is sudden and unpremeditated.

ACCESSORY NERVES, in *Anatomy*, a pair of nerves, which, arising from the medulla in the vertebræ of the neck, ascend, and enter the skull, and pass out of it again with the par vagum, wrapped up in the same common integument, and after quitting them, are distributed into the muscles of the neck and shoulders. See *ANATOMY*.

ACCESSORY, among *Painters*, an epithet given to such parts of a history-piece as serve chiefly for ornament, and might have been wholly left out: such as vases, armour, &c.

ACCI, in *Ancient Geography*, a town of Tarraconensis, formerly called *Acti*; supposed to be *Guadix*, to the east of the city of Granada in Spain, at the foot of a mountain, near the source of the rivulet Guadalantín; now greatly decayed. It is the Colonia Accitana Gemella, and was of some repute among the Roman colonies. The people were called Gemellenses, because the colony consisted of colonists from the third and sixth legions.

ACCIAIOLI, DONATO, a native of Florence, was born in 1428, and was famous for his learning and the honourable employments which he held. He wrote, a Latin translation of some of Plutarch's Lives; Commentaries on Aristotle's Ethics and Politics; and the Lives of Hannibal, of Scipio, and of Charlemagne. He was sent to France by the Florentines, to solicit aid from Louis XI. against Pope Sixtus IV. but on his journey died at Milan in 1478; his body was carried to Florence, and buried in the church of the Carthu-

sians at the public expence. The small fortune he left his children is a proof of his probity and disinterestedness. His daughters, like those of Aristides, were portioned by his fellow-citizens, as an acknowledgement of his services. His funeral eulogium was spoken by Christopher Landini; and an elegant epitaph, by Politian, was inscribed on his tomb.

ACCIDENT, in a general sense, denotes any casual event.

ACCIDENT, among *Logicians*, is used in a threefold sense. 1. Whatever does not essentially belong to a thing; as the clothes a man wears, or the money in his pocket. 2. Such properties in any subject as are not essential to it; thus whiteness in paper is an accidental quality. 3. In opposition to substance, all qualities whatever are called accidents; as sweetness, softness, &c.

ACCIDENT, in *Grammar*, implies a property attached to a word, without entering into its essential definition; for every word, notwithstanding its signification, will be either primitive, derivative, simple, or compound, which are the accidents of words. A word is said to be primitive, when it is taken from no other word in the language in which it is used: thus *heaven*, *king*, *good*, are primitive words. It is said to be derivative, when it is taken from some other word: thus *heavenly*, *kingdom*, *goodness*, &c. are derivatives. A simple word is easily distinguished from a compound: thus *just*, *justice*, are simple words; *unjust*, *injustice*, are compound: *res* is a simple word, as well as *publica*; but *respublica* is a compound. Besides these accidents which are common to all sorts of words, each particular species has its accidents: thus the accidents of the noun substantive are the gender, declension, and number; and the adjective has another accident, namely, the comparison. See the articles *GRAMMAR* and *LANGUAGE*.

ACCIDENT, in *Heraldry*, an additional point or mark in a coat of arms, which may be either omitted or retained without altering the essence of the armour; such as abatement, difference, and tincture.

ACCIDENTAL, in a general sense, implies something that happens by accident, or that is not essential to its subject.

ACCIDENTAL, in *Philosophy*, is applied to that effect which flows from some cause intervening by accident, without being subject, or at least without any appearance of being subject, to general laws or regular returns. In this sense, *accident* is opposed to *constant* and *principal*. Thus the sun's place is, with respect to the earth, the constant and principal cause of the heat in summer, and the cold in winter; whereas winds, snows, and rains, are the accidental causes which often alter and modify the action of the principal cause.

ACCIDENTAL Colours, are those which depend upon the affections of the eye, in contradistinction to those which belong to the light itself. The impressions made upon the eye by looking steadfastly on objects of a particular colour are various, according to the single colour or combination of colours in the object; and they continue for some time after the eye is withdrawn, and give a false colouring to other objects. M. Buffon has endeavoured to trace the connections which these accidental colours have with such as are natural, in a variety of instances. The subject has also been considered

Accident
||
Accidental.

Acciusus
||
Accius.

considered by De la Hire and M. Æpinus; and M. d'Arcy has contrived a machine for determining the duration of those impressions on the eye; and from the result of several experiments, he inferred, that the effect of the action of light on the eye, continued about eight thirds of a minute.

ACCIDENTAL Point, in *Perspective*, is that point in the horizontal line where the projections of two lines parallel to each other meet the perspective plane.

ACCIPENSER. See *ICHTHYOLOGY Index*.

ACCIPITER, among the Romans, signified a hawk, which, from its being very carnivorous, they considered as a bird of bad omen:

Odimus accipitrem, quia semper vivit in armis. OVID.

Pliny, however, tells us, that in some cases, particularly in marriage, it was esteemed a bird of good omen, because it never eats the hearts of other birds; intimating thereby, that no differences in a married state ought to reach the heart. The accipiter was worshipped as a divinity by the inhabitants of Teutyra, an island in the Nile, being considered by them as the image of the sun; and hence we find that luminary represented, in hieroglyphics, under the figure of a hawk.

ACCIPITRES, the name of Linnaeus's first order of Birds. See *ORNITHOLOGY*.

ACCISIMUS denotes a feigned refusal of something which a person earnestly desires. The word is Latin; or rather Greek, *Ακισμος*; supposed to be formed from *Acco*, the name of a foolish old woman noted in antiquity for an affectation of this kind.

Accismus is sometimes considered as a virtue; sometimes as a vice, which Augustus and Tiberius practised with great success. Cromwell's refusal of the crown of England may be brought as an instance of an *accismus*.

ACCISIMUS is more particularly used, in *Rhetoric*, as a species of irony.

ACCITUM, in *Ancient Geography*, a town of Hispania Bætica, now *Finiana*, as appears from an ancient inscription; situated on an eminence of the mountains Alpaxaras, in the province of Granada in Spain.

ACCIUS, LUCIUS, a Latin tragic poet, the son of a freedman, and, according to St Jerome, born in the consulship of Hostilius Mancinus and Atilius Serranus, in the year of Rome 583; but there appears somewhat of confusion and perplexity in this chronology. He made himself known before the death of Pacuvius, by a dramatic piece which was exhibited the same year that Pacuvius brought one upon the stage, the latter being then eighty years of age, and Accius only thirty. We do not know the name of this piece of Accius's, but the titles of several of his tragedies are mentioned by various authors. He wrote on the most celebrated stories which had been represented on the Athenian stage; as *Andromache*, *Andromeda*, *Atræus*, *Clytemnestra*, *Medea*, *Meleager*, *Philodætes*, the civil wars of Thebes, *Tereus*, the *Troades*, &c. He did not always, however, take his subjects from the Grecian story; for he composed one dramatic piece wholly Roman: it was entitled *Brutus*, and related to the expulsion of the Tarquins. It is affirmed by some that he wrote also comedies; which is not unlikely, if he was the author of two pieces, the *Wedding* and the *Merchant*, which have been ascribed to him. He

did not confine himself to dramatic writing; for he left other productions, particularly his annals, mentioned by Macrobius, Priscian, Festus, and Nonnius Marcellus. He has been censured for writing in too harsh a style, but in all other respects has been esteemed a very great poet. He was so much esteemed by the public, that a comedian was punished for only mentioning his name on the stage. Cicero speaks with great derision of one Accius who had written a history; and, as our author had wrote annals, some insist that he is the person censured: but as Cicero himself, Horace, Quintilian, Ovid, and Paterculus, have spoken of our author with so much applause, we cannot think it is the same person whom the Roman orator censures with so much severity.

There was also in this age a pretty good orator of the same name, against whom Cicero defended Cluentius. He was born in Pisaurum, and perhaps was a relation of our poet.

ACCIUS, a poet of the 16th century, to whom is attributed *A Paraphrase of Æsop's Fables*, on which Julius Scaliger bestows great encomiums.

ACCLAMATION, a confused noise or shout of joy, by which the public express their applause, esteem, or approbation.

ACCLAMATION, in a more proper sense, denotes a certain form of words, uttered with extraordinary vehemence, and in a peculiar tone somewhat resembling a song, frequent in the ancient assemblies. Acclamations were usually accompanied with applauses, with which they are sometimes confounded: though they ought to be distinguished; as acclamation was given by the voice, applause by the hands: add, that acclamation was also bestowed on persons absent, applause only on those present. Acclamation was also given by women, whereas applause seems to have been confined to men.

Acclamations are of various kinds; ecclesiastical, military, nuptial, senatorial, synodical, scholastic, theatrical, &c. We meet with loud acclamations, musical and rhythmical acclamations; acclamations of joy and respect, and even of reproach and contumely. The former, wherein words of happy omen were used, were also called *Laudationes*, *et bona vota*, or good wishes; the latter, *Execrationes et convicia*. Suetonius furnishes an instance of this last kind in the Roman senate, on occasion of the decree for demolishing the statues of Domitian, when the fathers, as the historian represents, it, could not refrain from contumelious acclamations of the deceased. The like were shown after the death of Commodus, where the acclamations run in the following strain: *Hosti patria honores detrahantur, parricide honores detrahantur; hostis statuas undique, parricide statuas undique, gladiatoris statuas undique*, &c.—The formula, in acclamations, was repeated sometimes a greater, sometimes a lesser, number of times. Hence we find in Roman writers, *acclamatum est quinques, et vices*; five times, and twenty times: sometimes also *sexages, et even octuages*; sixty and eighty times.

Acclamations were not unknown on the theatres in the earliest ages of the Roman commonwealth; but they were artless then, and little other than confused shouts. Afterwards they became a sort of regular concerts. That mentioned by Phædrus, *lætare incolomis Roma salvo principe*, which was made for Augustus, and proved the occasion of a pleasant mistake of a flute-player

Accius,
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Acclama-
tion.

Acclama-
tion.

player called *Princeps*, shows that musical acclamations were in use in that emperor's reign. *Revertentem ex Provincia modulatis carminibus proferebantur*, says Suetonius, who gives another instance in the time of Tiberius: a false report of Germanicus's recovery being spread through Rome, the people ran in crowds to the capitol with torches and victims, singing, *Salva Roma, Salva Patria, Salvus est Germanicus*.—Nero, passionately fond of music, took special care to improve and perfect the music of acclamations. Charmed with the harmony with which the Alexandrians, who came to the games celebrated at Naples, had sung his praises, he brought several over to instruct a number of youth, chosen from among the knights and people, in the different kinds of acclamations practised at Alexandria. These continued in use as long as the reign of Theodoric. But the people did not always make a single chorus; sometimes there were two, who answered each other alternately: thus, when Nero played on the theatre, Burrhus and Seneca, who were on either hand, giving the signal by clapping, 5000 soldiers called *Augustals*, began to chant his praise, which the spectators were obliged to repeat. The whole was conducted by a music-master called *mesochorus* or *pau-sarius*.—The honour of acclamations was chiefly rendered to emperors, their children, and favourites; and to the magistrates who presided at the games. Persons of distinguished merit also sometimes received them, of which Quintilian gives us instances in Cato and Virgil. The most usual forms were, *Feliciter, Longiorem vitam, Annos felices*. The actors themselves, and they who gained the prizes in the games of the circus, were not excluded the honour of acclamations.

To theatrical acclamations may be added those of the soldiery and the people in time of triumph. The victorious army accompanied their general to the capitol; and, among the verses they sung in his praises, frequently repeated *Ю ТРИУМФЕ*, which the people answered in the same strain. It was also in the way of acclamation, that the soldiers gave their general the title of *Imperator*, after some notable victory: a title which he only kept till the time of his triumph.

The acclamations of the senate were somewhat more serious than the popular ones; but arose from the same principle, *viz.* a desire of pleasing the prince or his favourites; and aimed likewise at the same end, either to express the general approbation and zeal of the company, or to congratulate him on his victories, or to make him new protestations of fidelity. These acclamations were usually given after a report made by some senator, to which the rest all expressed their consent by crying *OMNES, OMNES*; or else, *ÆQUUM EST, JUSTUM EST*. Sometimes they began with acclamations, and sometimes ended with them without other debates. It was after this manner that all the elections and proclamations of emperors, made by the senate, were conducted; something of which practice is still retained at modern elections of kings and emperors, where *Vivat Rex, and Long live the King*, are customary forms of acclamation.

The Greeks borrowed the custom of receiving their emperors in the public places from the Romans. Luitprand relates, that at a procession where he was present, they sung to the emperor Nicephorus, *πολλὰ εἶπες*;

Acclama-
tion.

that is, Many years: which Coddin expresses thus, by *το πολλὰ το πολυχρονίον*, or by *το πολυχρονίον*; and the wish or salutation by *πολυχρονίωμα*. And at dinner, the Greeks then pretend willed with a loud voice to the emperor and Bardas, *Ut Deus annos multiplicet*; as he translates the Greek. Plutarch mentions an acclamation so loud, upon occasion of Flaminius's restoring liberty to Greece, that the very birds fell from heaven with the shout. The Turks practise something like this on the sight of their emperors and grand viziers to this day.

For the acclamations with which authors, poets, &c. were received, who recited their works in public; it is to be observed, the assemblies for this purpose were held with great parade in the most solemn places, as the capitol, temples, the Athenæum, and the houses of great men. Invitations were sent everywhere, in order to get the greater appearance. The chief care was, that the acclamations might be given with all the order and pomp possible. Men of fortune who pretended to wit, kept able applauders in their service, and lent them to their friends. Others endeavoured to gain them by presents and treats. Philostratus mentions a young man named Vavus, who lent money to the men of letters, and forgave the interest to such as applauded his exercises. These acclamations were conducted much after the same manner as those in the theatre, both as to the music and the accompaniments: they were to be suited both to the subject and to the person. There were particular ones for the philosophers, for orators, for historians, and for poets. It would be difficult to rehearse all the forms of them; one of the most usual was *Sopbos*, which was to be repeated three times. Martial comprehends several other usual forms in this verse:

Graviter, Citò, Nequiter, Euge, Beati.

Neither the Greeks nor Romans were barren on this head. The names of gods and heroes were given those whom they would extol. It was not enough to do it after each head of discourse, chiefly after the exordium; but the acclamations were renewed at every fine passage, frequently at every period.

The acclamations with which the spectators honoured the victories of the athlete, were a natural consequence of the impetuous motions which attended the gymnastic games. The cries and acclamations of the people, sometimes expressing their compassion and joy, sometimes their horror and disgust, are strongly painted by different poets and orators.

Acclamations made also a part of the ceremony of marriage. They were used for the women's sake; as being the *Lata Omina*, sometimes spoken of before marriage in Roman writers.

Acclamations, at first practised in the theatre, and passing thence to the senate, &c. were in process of time received into the acts of councils, and the ordinary assemblies of the church. The people expressed their approbation of the preacher variously; the more usual forms were, *Orthodox! Tbird Apostle, &c.* These acclamations being sometimes carried to excess, and often misplaced, were frequently prohibited by the ancient doctors, and at length abrogated; though they appear to have been in some use about the time of St Bernard.

ACCLAMATION

Acclivity
||
Accolti.

ACCLAMATION MEDALS, among *Antiquaries*, such as represent the people expressing their joy in the posture of acclamation.

ACCLIVITY, the rise or ascent of a hill, in opposition to the declivity or descent of it. Some writers in fortification use it for the talus of a rampart.

ACCOLA, among the Romans, signified a person who lived *near* some place; in which sense, it differed from *incola*, the *inhabitants* of such a place.

ACCOLADE, a ceremony anciently used in the conferring of knighthood.

Antiquaries are not agreed wherein the accolade properly consisted. The generality suppose it to be the embrace, or kiss, which princes anciently gave the new knight, as a token of their affection: whence the word *accolade*; *q. d.* a clasping, or taking round the neck. Others will rather have it to be a blow on the chine of the neck, given on the same occasion. The Accolade is of some antiquity, in whichsoever of the two senses it be taken. Greg. de Tours writes, that the kings of France, even of the first race, in conferring the gilt shoulder-belt, kissed the knights on the left cheek. For the *accolée*, or blow, John of Salisbury assures us, it was in use among the ancient Normans: by this it was that William the Conqueror conferred the honour of knighthood on his son Henry. At first it was given with the naked fist; but was afterwards changed into a blow with the flat of the sword on the shoulder of the knight.

ACCOLÉ/E, sometimes synonymous with **ACCOLADE**, which see.—It is also used in various senses in heraldy; sometimes it is applied to two things joined; at other times, to animals with crowns or collars about their necks, as the lion in the Ogilvy's arms; and, lastly, to keys, battons, maces, swords, &c. placed saltierwise behind the shield.

ACCOLTI, **BENEDICT**, the younger, grandson of Benedict Accolti the elder, who flourished about the year 1376, was born at Arezzo in 1415. About the year 1450, he was appointed secretary to the republic of Florence, when he was greatly distinguished. He wrote "Four Books concerning the War which the Christians carried on against the Infidels to recover Judæa and the Holy Sepulchre." This work was printed at Venice in 1532, and it is the ground-plot of Tasso's *Jerusalem Delivered*. He wrote also an account of the "Excellent Personages of his Time," in the form of dialogue. He died in 1466.

ACCOLTI, **Benedict**, was nephew, or according to some, grandson of Peter Accolti, and was born at Florence in 1497. He was much distinguished for his knowledge of law, and a most retentive memory; and was such a master of the Latin language, that he obtained the flattering appellation of *the Cicero of the age*. He enjoyed very high ecclesiastical honours: Leo X. bestowed on him the bishopric of Cadiz; Adrian the VI. gave him that of Cremona, and the archbishopric of Ravenna; and Clement VII. raised him to the rank of cardinal. At the request of Clement, he wrote a treatise in vindication of the pope's right to the kingdom of Naples. He left several other works, and particularly some pieces of poetry. He died at Florence in 1549.

ACCOLTI, **Francis**, brother of the former, was born about the year 1418. He was professor of jurispru-

dence in several universities, and was styled the *prince of lawyers*. His understanding was vigorous, his knowledge was extensive, and his eloquence powerful; but he was so fondly parsimonious that he amassed immense treasures. He died about the year 1470; and left behind him several works on law, and some translations of the works of Chrysostom.

ACCOLTI, **Peter**, the son of Benedict the younger, was born at Arezzo about the year 1455. He was a professor of law, and taught with great reputation. He was successively raised to several bishoprics, and at last to the rank of cardinal in 1511. He was created by Pope Leo X. prince of the state of Nepi. He wrote a comedy entitled "Virginia," and some other poems which were much applauded by his contemporaries. He died at Rome in 1532.

ACCOMMODATION, the application of one thing, by analogy, to another; or the making two or more things agree with one another.

To know a thing by *accommodation*, is to know it by the idea of a similar thing referred thereto.

A prophecy of scripture is said to be fulfilled various ways; properly, as when a thing foretold comes to pass; and improperly, or by way of *accommodation*, when an event happens to any place or people, like to what fell out some time before to another.—Thus, the words of Isaiah, spoken to those of his own time, are said to be fulfilled in those who lived in our Saviour's; and are *accommodated* to them: "Ye hypocrites, well did Esaus prophecy of you," &c. which same words St Paul afterwards *accommodates* to the Jews of his time.

The primitive church *accommodated* multitudes of Jewish, and even heathen ceremonies and practices, to Christian purposes; but the Jews had before done the same by the Gentiles: some will even have circumcision, the tabernacle, brazen serpent, &c. to have been originally of Egyptian use, and only *accommodated* by Moses to the purposes of Judaism*. Spencer maintains, that most of the rites of the old law were in imitation of those of the Gentiles, and particularly of the Egyptians; that God, in order to divert the children of Israel from the worship they paid to their false deities, consecrated the greatest part of the ceremonies performed by those idolaters, and had formed out of them a body of the ceremonial law; that he had indeed made some alterations therein, as barriers against idolatry; and that he thus *accommodated* his worship to the genius and occasions of his ancient people. To this concession of God, according to Spencer †, is owing the origin of the tabernacle, and particularly that of the ark. These opinions, however, have been controverted by later writers.

ACCOMPANIMENT, something attending or added as a circumstance to another, either by way of ornament, or for the sake of symmetry.

ACCOMPANIMENT, **ACCOMPAGNAMENTO**, **ACCOMPAGNATURA**, in *Music*, denotes the instruments which accompany a voice, in order to sustain it, as well as to make the music more full. The accompaniment is used in recitative, as well as in song; on the stage, as well as in the choir, &c. The ancients had likewise their accompaniments in the theatre; they had even different kinds of instruments to accompany the chorus, from those which accompanied the actors in the recitation.

Accommo-
dation
||
Accompa-
niment.

* Saurin,
Diff. O. T.
tom. i.

† De legib.
Hebr. diff. i.
l. 3. p. 32.

Accompaniment || **Accords.**
 The accompaniment, among the moderns, is frequently a different part or melody from the song it accompanies. It is disputed whether it was so among the ancients. It is generally alleged, that their accompaniments went no farther than the playing in octave, or in antiphony to the voice. The Abbé Fraguier, from a passage in Plato, pretends to prove, that they had actual symphony, or music in parts: but his arguments seem far from being conclusive.

ACCOMPANIMENT, in *Painting*, denotes such objects as are added, either by way of ornament or fitness to the principal figures; as dogs, guns, game, &c. in a hunting piece.

ACCOMPANIMENT, in *Heraldry*, any thing added to a shield by way of ornament; as the belt, mantling, supporters, &c. It is also applied to several bearings about a principal one; as a saltier, bend, fess, chevron, &c.

ACCOMPLICE, one that has a hand in a business, or is privy in the same design or crime with another. See **ACCESSORY**.

By the law of Scotland, the *accomplice* can only be prosecuted after the conviction of the *principal* offender, unless the accession of the *accomplice* is immediate, in *ipso actu*, so as in effect to render them *co-principal*. By the general rule, the *accomplice* suffers the same punishment with the *principal* offender; yet if he be remarkably less guilty, justice will not permit equal punishment.

The council of Sens, and several other synodical statutes, expressly prohibit the revealing of *accomplices*.

ACCOMPLISHMENT, the entire execution or fulfilling of any thing.

ACCOMPLISHMENT is principally used in speaking of events foretold by the Jewish prophets in the Old Testament, and fulfilled under the New. We say a literal accomplishment, a mystical or spiritual accomplishment, a single accomplishment, a double accomplishment, a Jewish accomplishment, a Christian, a heathen accomplishment. The same prophecy is sometimes accomplished in all, or in several of those different ways. Thus, of some of the prophecies of the Old Testament, the Jews find a literal accomplishment in their own history, about the time when the prophecy was given: the Christians find another in Christ, or the earliest days of the church; the heathens another, in some of their emperors; the Mahometans another, in their legislator, &c. There are two principal ways of accomplishing a prophecy, *directly*, and by *accommodation*. See **ACCOMMODATION**, and **PROPHECY**.

ACCOMPLISHMENT, is also used for any mental or personal endowment.

ACCORD, in *Painting*, is the harmony that reigns among the lights and shades of a picture.

ACCORDS, STEPHEN TABOUROT, SEIGNEUR DES, advocate in the parliament of Dijon in France, and king's advocate in the bailiwick and chancery of that city, was born in 1549. He was a man of genius and learning; but too much addicted to trifles, as appears from his piece, entitled, "Les Bigarrures," printed at Paris in 1582. This was not his first production, for he had before printed some sonnets. His work, entitled *Les Touches*, was published at Paris in 1585; which is indeed a collection of witty poems, but worked up in

a loose manner, according to the licentious taste of that age. His Bigarrures are written in the same strain. He was censured for this way of writing, which obliged him to publish an apology. The lordship of Accords is an imaginary fief or title from the device of his ancestors, which was a drum, with the motto *à tous accords*, " chiming with all." He had sent a sonnet to a daughter of M. Begat, the great and learned president of Burgundy, "who (says he) did me the honour to love me: And inasmuch (continues he), I had subscribed my sonnet with only my device *à tous accords*, this lady first nicknamed me, in her answer, *Seigneur des Accords*; by which title her father also called me several times. For this reason I chose this surname, not only in all my writings composed at that time, but even in these books." He died in 1595, in the 46th year of his age.

ACCORSO (in Latin *Accursius*), FRANCIS, the elder, an eminent lawyer, was born at Bagnolo, near Florence, in 1182. He began the study of law at a late period of life; but such were his assiduity and proficiency, that he soon distinguished himself. He was appointed professor at Bologna, and became a very eminent teacher. He undertook the great work of uniting and arranging into one body the almost endless comments and remarks upon the Code, the Institutes, and Digests, which, he observed, only tended to involve the subjects in obscurity and contradiction. When he was employed in this work, it is said, that hearing of a similar one proposed and begun by Odo-fred, another lawyer of Bologna, he feigned indisposition, interrupted his public lectures, and shut himself up, till he had, with the utmost expedition, accomplished his design. His work, entitled "A Perpetual Commentary," was much esteemed. It was printed with the "Body of Law," published at Lyons in 1627. He died in 1260, and left very great riches. His son, the younger Francis Accorso, succeeded him in his professorship, and accompanied Edward I. to England, on his return from the crusade in 1237. (*Gen. Biog.*)

Accorso, *Mariangelo*, a learned and ingenious critic, was a native of Aquila, in the kingdom of Naples, and lived about the beginning of the sixteenth century. To a perfect knowledge of Greek and Latin, he added an intimate acquaintance with several modern languages. Classical literature was much improved and promoted by his labours. In discovering and collating ancient manuscripts he displayed uncommon assiduity and diligence. His work, entitled "*Diatribæ*," printed at Rome, in folio, in 1524, is a singular monument of erudition and critical skill. He bestowed, it is said, unusual pains on Claudian, and made above seven hundred corrections in the works of that poet, from different manuscripts. Unfortunately the world has been deprived of the advantage of these criticisms; for they were never published. These corrections were made while he travelled on horseback during a tour through Germany, a circumstance which is strongly characteristic of his industry and assiduity. An edition of *Ammianus Marcellinus*, which he published at Augsburg in 1533, contains five books more than any former one. He was the first editor of the "Letters of Cassiodorus," with his "Treatise on the Soul." The affected use

Account
||
Accretion.

use of antiquated terms introduced by some of the Latin writers of that age, is humourously ridiculed in a dialogue published in 1531, entitled, "*Osco, Vol- sco, Romanoque, Eloquentia, Interlocutoribus, Dialogus Ludis Romanis actus.*" He composed a book on the invention of printing. On the first leaf of a grammar of Donatus, printed on vellum, there is written with his own hand: "This Donatus, with another book entitled "*Confessionalia,*" were the first books printed; and John Faustus, citizen of Mentz, inventor of the art, had put them to the press in the year 1450." He had been accused of plagiarism in his notes on Ausonius; and the solemn and determined manner in which he repelled this charge of literary theft, presents us with a singular instance of his anxiety and care to preserve his literary reputation unstained and pure. It is in the following oath: "In the name of gods and men, of truth and sincerity, I solemnly swear, and, if any declaration be more binding than an oath, I in that form declare, and I desire that my declaration may be received as strictly true, that I have never read or seen any author, from which my own lucubrations have received the smallest assistance or improvement; nay, that I have even laboured, as far as possible, whenever any writer has published any observations which I myself had before made, immediately to blot them out of my own works. If in this declaration I am forsworn, may the pope punish my perjury; and may an evil genius attend my writings, so that whatever in them is good, or at least tolerable, may appear to the unskilful multitude exceedingly bad, and even to the learned trivial and contemptible; and may the small reputation I now possess be given to the winds, and regarded as the worthless boon of vulgar levity." (*Gen. Biog.*)

ACCOUNT, or **ACCOMPT**, in a general sense, a computation or reckoning of any thing by numbers.—Collectively it is used to express the books which merchants, traders, bankers, &c. use for recording their transactions in business. See **BOOK-KEEPING**.

Chamber of ACCOUNTS, in the French polity, a sovereign court of great antiquity, which took cognizance of and registered the accounts of the king's revenue; nearly the same with the English *Court of Exchequer*.

ACCOUNT is taken sometimes, in a particular sense, for the computation of time: thus we say, the Julian Account, the Gregorian Account, &c. in which sense it is equivalent to *style*.

ACCOUNTANT, or **ACCOUNTANT**, in the most general sense, is a person skilled in accounts. In a more restricted sense, it is applied to a person, or officer appointed to keep the accounts of a public company or office: as the South Sea, the India Company, the Bank, the Excise, &c.

ACCOUNTANTSHIP, the art of keeping and balancing accounts. See **BOOK-KEEPING**.

ACCOUNTANT-GENERAL, a new officer in the court of chancery, appointed by act of parliament to receive all monies lodged in court instead of the masters, and convey the same to the bank of England for security.

ACCOUREMENT, an old term applied to the furniture of a soldier, knight, or gentleman.

ACCRETION, in *Physics*, the increase or growth of an organical body, by the accession of new parts. See **NUTRITION**, **PLANTS**, and **VEGETABLES**.

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ACCRETION, among *Civilians*, the property acquired in a vague or unoccupied thing, by its adhering to or following another already occupied: thus, if a legacy be left to two persons, one of whom dies before the testator, the legacy devolves to the survivor by right of accretion.

Accroche
||
Accrued.

ACCROCHE, in *Heraldry*, denotes a thing's being hooked with another.

ACCUBATION, a posture of the body, between sitting and lying. The word comes from the Latin *accubare*, compounded of *ad*, to, and *cubo*, I lie down. *Accubation*, or *Accubitus*, was the table posture of the Greeks and Romans; whence we find the words particularly used for the lying, or rather (as we call it) sitting down to meat. The Greeks introduced this posture. The Romans, during the frugal ages of the republic, were strangers to it; but as luxury got footing, this posture came to be adopted, at least by the men; for as to women, it was reputed an indecency in them to lie down among the men: though, afterwards, this too was got over. Children did not lie down, nor servants, nor soldiers, nor persons of meaner condition. They took their meals sitting, as a posture less indulgent. The Roman manner of disposing themselves at table was this: A low round table was placed in the *cœnaculum*, or dining room, and, about this, usually three, sometimes only two, beds or couches; and according to their number, it was called *bichlinium* or *triclinium*. These were covered with a sort of bedclothes, richer or plainer according to the quality of the person, and furnished with quilts and pillows, that the guests might lie the more commodiously. There were usually three persons on each bed; to crowd more, was esteemed fordid. In eating, they lay down on their left sides, with their heads resting on the pillows, or rather on their elbows. The first lay at the head of the bed, with his feet extended behind the back of the second; the second lay with the back of his head towards the navel of the first, only separated by a pillow, his feet behind the back of the third; and so of the third or fourth. The middle place was esteemed the most honourable. Before they came to table, they changed their clothes, putting on what they called *cœnatoria vestis*, the dining garment; and pulled off their shoes, to prevent soiling the couch.

ACCUBITOR, an ancient officer of the emperors of Constantinople, whose business was to lie near the emperor. He was the head of the youth of the bed-chamber, and had the *cubicularius* and *procubitor* under him.

ACCUMULATION, in a general sense, the act of heaping or amassing things together. Among lawyers, it is used in speaking of the concurrence of several titles to the same thing, or of several circumstances to the same proof.

ACCUMULATION of Degrees, in a university, is the taking several of them together, or at shorter intervals than usual or than is allowed by the rules of the university.

ACCURSED, something that lies under a curse, or sentence of excommunication.

In the Jewish idiom, *accursed* and *crucified* were synonymous. Among them, every one was accounted *accursed* who died on a tree. This serves to explain the difficult passage in Rom. ix. 3. where the apostle

R

Paul

Accusation Paul wishes himself *accursed after the manner of Christ*, i. e. crucified, if happily he might by such a death save his countrymen. The proposition *απο* here made use of, is used in the same sense, 2 Tim. i. 3. where it obviously signifies *after the manner of*.

Accusative.

ACCUSATION, the charging any person with a criminal action, either in one's own name, or in that of the public. The word is compounded of *ad*, to; and *causari* to plead.

Writers on politics treat of the benefit and the inconveniencies of public accusations. Various arguments are alleged, both for the encouragement and discouragement of accusations against great men. Nothing, according to Machiavel, tends more to the preservation of a state, than frequent accusations of persons trusted with the administration of public affairs. This, accordingly, was strictly observed by the Romans, in the instances of Camillus, accused of corruption by Manlius Capitolinus, &c. Accusations, however, in the judgment of the same author, are not more beneficial than calumnies are pernicious; which is also confirmed by the practice of the Romans. Manlius not being able to make good his charge against Camillus, was cast into prison.

By the *Roman law*, there was no public accuser for public crimes; every private person, whether interested in the crime or not, might accuse, and prosecute the accused to punishment, or absolution. Cato, the most innocent person of his age, had been accused 42 times, and as often absolved. But the accusation of *private crimes* was never received but from the mouths of those who were immediately interested in them: None (*e. g.*) but the husband could accuse his wife of adultery.

The ancient Roman lawyers distinguished between *postulatio*, *delatio*, and *accusatio*. For, first, leave was desired to bring a charge against one, which was called *postulare*: then he against whom the charge was laid was brought before the judge; which was called *deferre*, or *nominis delatio*: lastly, the charge was drawn up and presented; which was properly the *accusatio*. The accusation properly commenced, according to Pœdianus, when the *reus* or party charged, being interrogated, denied he was guilty of the crime, and subscribed his name to the *delatio* made by his opponent.

In the *French law*, none but the procureur general, or his deputies, can form an accusation, except for high treason and coining, where accusation is open to every body. In other crimes, private persons can only act the part of denouncers, and demand reparation for the offence, with damages.

In *Britain*, by Magna Charta, no man shall be imprisoned or condemned on any accusation, without trial by his peers, or the law; none shall be vexed with any accusation, but according to the law of the land; and no man may be molested by petition to the king, &c. unless it be by indictment or presentment of lawful men, or by process at common law. Promoters of suggestions, are to find surety to pursue them; and if they do not make them good, shall pay damages to the party accused, and also a fine to the king. No person is obliged to answer upon oath to a question whereby he may accuse himself of any crime.

ACCUSATIVE, in *Latin Grammar*, is the fourth

case of nouns, and signifies the relation of the noun on which the action implied in the verb terminates; and hence, in such languages as have cases, these nouns have a particular termination, called *accusative*, as, *Augustus vicit Antonium*, Augustus vanquished Antony. Here *Antonium* is the noun on which the action implied in the word *vicit* terminates; and, therefore, must have the accusative termination. Ovid, speaking of the palace of the sun, says, *Materiem superabat opus*, The work surpassed the materials. Here *materiem* has the accusative termination; because it determines the action of the verb *superabat*.—In the English language there are no cases, except the genitive; the relation of the noun being shown by the assistance of prepositions, as *of*, *to*, *from*, &c.

Accusivum

Accusative.

ACCUSIORUM COLONIA, in *Ancient Geography*, an inland town in the Cavares, in Gallia Narbonensis; now *Grenoble*, in Dauphiné. See *GRENOBLE*.

ACE, among gamesters, a card or die marked only with one point.

ACELDAMA, in *Scripture History*, a place without the south wall of Jerusalem, beyond the brook of Siloam, was called the Potters field, because clay of which pots were made was dug out of it. It was afterwards bought with the money with which the high priests and rulers of the Jews purchased the blood of Jesus Christ, and hence it was called *Aeldama*, the field of blood.

ACELUM, or ACELIUM, in *Ancient Geography*, a town of the Venetian territory, now called *Azolo*, situated to the west of Treviso, at the source of the rivulet Musone. E. Long. 13°. N. Lat. 45°.

ACENTETUM, or ACANTETA, in *Natural History*, a name given by the ancients to the purest and finest kind of rock crystal: They used the crystal in many ways; sometimes engraving on it, and sometimes forming it into vases and cups, which were held next in value to the *vasa murrhina* of those times. The crystal they obtained from the island of Cyprus was much esteemed; but often faulty in particular parts, having hairs, cracks, and foulnesses, which they called *salts*, in the middle of the large pieces. Pliny tells us, that when it was used for engraving on, the artist could conceal all these blemishes among the strokes of his work; but when it was to be formed into cups or precious vases, they always chose the acentetum which had no flaws or blemishes.

ACEPHALI, or ACEPHALITE, a term applied to several sects who refused to follow some noted leader. Thus the persons who refused to follow either John of Antioch, or St Cyril, in a dispute that happened in the council of Ephesus, were termed *Acephali*, without a head or leader. Such bishops, also, as were exempt from the jurisdiction and discipline of their patriarch, were styled *Acephali*.

ACEPHALI, the levellers in the reign of King Henry I. who acknowledged no head or superior. They were reckoned so poor, that they had not a tenement by which they might acknowledge a superior lord.

ACEPHALOUS, or ACEPHALUS, in a general sense; without a head.

The term is more particularly used in speaking of certain nations, or people, represented by ancient naturalists and cosmographers, as well as by some modern travellers,

Accephalous travellers, as formed without heads; their eyes, mouth, &c. being placed in other parts.

Such are the Blemmyes, a nation of Africa near the head of the Niger, represented to be by Pliny and Solinus; *Blemmyes traduntur capita abesse, ore et oculis peSore affixis*. Ctesias and Solinus mention others in India near the Ganges, *sine cervice, oculos in humeris habentes*. Mela also speaks of people, *quibus capita et vultus in peSore sunt*. And Suidas, Stephanus Byzantinus, Vopiscus, and others after them, relate the like. Some modern travellers still pretend to find Accephalous people in America.

Several opinions have been framed as to the origin of the fable of the Acephali. The first is that of Thomas Bartholin, who turns the whole into a metaphor; being convinced, that the name Acephali was anciently given to such as had less brain, or conducted themselves less by the rules of prudence than others. Olearius rather apprehends, that the ancient voyagers, viewing certain barbarous people from the coasts, had been imposed on by their uncouth dress; for that the Samogitians, being short of stature, and going in the severity of winter with their heads covered in hoods, seem at a distance as if they were headless. F. Laftau says, that by Acephali are only meant people whose heads are sunk below their shoulders. In effect, Hulfius, in his epitome of Sir Walter Raleigh's voyage to Guiana, also speaks of a people which that traveller found in the province of Iripinama, between the lakes of Panama and Cassipa, who had no head or neck; and Hondius, in his map, marks the place with the figures of these monsters. Yet De Laet* rejects the story; being informed by others, that the inhabitants of the banks of the Caora, a river that flows out of the lake of Cassipa, have their heads so far sunk between their shoulders, that many believed they had their eyes in their shoulders, and their mouths in their breasts.

But though the existence of a nation of Acephali be ill warranted, naturalists furnish several instances of individuals born without heads, by some lusus or deviation of nature. Wepfer gives† a catalogue of such acephalous births, from Schenckius, Licetus, Paræus, Wolfus, Mauriceau, &c.

ACEPHALUS, an obsolete term for the tæmia or tape-worm, which was long supposed to be acephalous. The first who gave it a head was Tulpius; and after him, Fehr: The former even makes it *biceps*, or two-headed.

ACEPHALUS, is also used to express a verse defective in the beginning.

ACER, the MAPLE or SYCAMORE TREE. See BOTANY Index.

ACERB, a four rough asstringency of taste, such as that of unripe fruit.

ACERINA, in *Icthyology*, a name given by Pliny and other of the old naturalists, to the fish we at this time call the *ruffe*. See PERCA, ICTHYOLOGY Index.

ACERNO, in *Geography*, a town of Italy, in the interior principality of Naples, with a bishop's see. It is situated 12 miles north-east of Salerno in E. Long. 15. 46. N. Lat. 40. 45.

ACERRA, in *Antiquity*, an altar erected, among the Romans, near the bed of a person deceased, on which his friends daily offered incense till his burial.—

The real intention probably was to overcome any offensive smell that might arise about the corpse. The Chinese have still a custom like this: they erect an altar to the deceased in a room hung with mourning; and place an image of the dead person on the altar, to which every one that approaches it bows four times, and offers oblations and perfumes.

The *acerra* also signified a little pot wherein were put the incense and perfumes to be burnt on the altars of the gods and before the dead. It appears to have been the same with what was otherwise called *thurbulum*, and *pyxis*.

We find mention of *acerræ* in the ancient church. The Jews had also their *acerræ*, in our version rendered *censers*; and the Romanists still retain them under the name of *incense pots*. In Roman writers, we frequently meet with *plena acerræ*, a full *acerra*: to understand which, it is to be observed, that people were obliged to offer incense in proportion to their estate and condition; the rich in larger quantities, the poor only a few grains; the former poured out full *acerræ* on the altar, the latter took out two or three bits with their fingers.

ACERRA, a town of Italy, in the kingdom of Naples, and in the Terra di Lavoro; seated on the river Agno, seven miles north-east of Naples. E. Long. 14. 30. N. Lat. 40. 55.

ACERRÆ, in *Ancient Geography*, the name of a town on the Clanius, in Campania, not far from Naples, now ACERRA.—The name also of another town, now called *la Girola*, in the territory and to the south-east of Lodi, where the rivulet Serio falls into the Adda, to the west of Cremona and north of Piacentia.

ACESINES, in *Ancient Geography*, a large and rapid river of India which Alexander passed in his expedition into that country. The kingdom of Porus, which was conquered by Alexander, lay between the Hydaspes and this river, which, uniting with the former and other considerable rivers, pours its waters into the Indus. According to Major Rennell, the modern Jenaub is the Acesines of the ancients.

ACESIUS, a bishop of Constantinople in the reign of Constantine, was a rigid adherent to the Novatian doctrines, according to which those whom persecutions had shaken from the faith, or who were guilty of any mortal sin after baptism, could not be admitted to the communion of the church, even after exhibiting the most convincing proofs of sincere repentance. Constantine, who was extremely displeased with the severity of this rigid sect, in discouraging and rejecting repentance, is said to have thus expressed himself: "Then, Acesius, make a ladder for yourself, and go up to heaven alone." (*Gen. Biog.*)

ACESCENT, a word used to denote any thing which is turning sour, or which is slightly acid. It is only applied properly to the former of these two meanings. The second may be expressed by either of the two words, *acidulous*, or *sub-acid*.

ACETABULUM, in *Antiquity*, a measure used by the ancients, equal to one-eighth of our pint. It seems to have acquired its name from a vessel in which acetum or vinegar was brought to their tables, and which probably contained about this quantity.

ACETABULUM, in *Anatomy*, a cavity in any bone

Acerra.

Acerra
Acetabulum.

* *Dys. vipt.*
Amer. l. 17.
c. 22.

† *In Epist.*
Gr. dec. 1.
an. 3. obs.
129. p. 184.
Dec. 2.
an. 9.
obscr. 143.
p. 253.

Acetabulum
||
Achæans.

for receiving the protuberant head of another, and thereby forming that species of articulation called ENARTHROSIS.

ACETABULUM, in *Botany*, the trivial name of a species of the peziza, or cup peziza, a genus belonging to the cryptogamia fungi of Linnæus. It has got the name of *acetabulum*, from the resemblance its leaves bear to a cup. See PEZIZA, *BOTANY Index*.

ACETARY. Grew, in his anatomy of plants, applies this term to a pulpy substance, in certain fruits, e. g. the pear, which is enclosed in a congeries of small calculous bodies towards the base of the fruit, and is always of an acid taste.

ACETOSA, SORREL; by Linnæus joined to the genus *Rumex*. See *BOTANY Index*.

ACETOSELLA, in *Botany*, a species of OXALIS. See *BOTANY Index*.

ACETOUS, an epithet applied to such substances as are sour, or partake of the nature of vinegar.

ACETUM, VINEGAR, the vegetable ACID of the chemists. See ACETOUS ACID, *CHEMISTRY Index*.

ACHABYTUS, in *Ancient Geography*, a high mountain in Rhodes, on the top of which stood a temple of Jupiter.

ACHÆA, in *Ancient Geography*, a town of the island of Rhodes, in the district of Jalyfus, and the first and most ancient of all, said to be built by the Heliades, or grandsons of the Sun.

ACHÆA, a hamlet of Asiatic Sarmatia, on the Euxine. The inhabitants were called *Achæi*, a colony of the Orchomenians.

ACHÆANS, the inhabitants of ACHAIA Propria, a Peloponnesian state. This republic was not considerable in early times, for the number of its troops, nor for its wealth, nor for the extent of its territories; but it was famed for its probity, its justice, and its love of liberty. Its high reputation for these virtues was very ancient. The Crotonians and Sybarites, to re-establish order in their towns, adopted the laws and customs of the Achæans. After the famous battle of Leuctra, a difference arose betwixt the Lacedæmonians and Thebans, who held the virtue of this people in such veneration, that they terminated the dispute by their decision. The government of the Achæans was democratical. They preserved their liberty till the time of Philip and Alexander: But in the reign of these princes, and afterwards, they were either subject to the Macedonians, who had made themselves masters of Greece, or oppressed by cruel tyrants. The Achæan commonwealth consisted of twelve inconsiderable towns in Peloponnesus. Its first annals are not marked by any great action, for they are not graced with one eminent character. After the death of Alexander, this little republic was a prey to all the evils which flow from political discord. Zeal for the good of the community was now extinguished. Each town was only attentive to its private interest. There was no longer any stability in the state; for it changed its masters with every revolution in Macedonia. Towards the 124th Olympiad, about the time when Ptolemy Soter died, and when Pyrrhus invaded Italy, the republic of the Achæans recovered its old institutions and unanimity. The inhabitants of Patræ and of Dymæ were the first assertors of ancient liberty. The tyrants were banished, and the towns again made one commonwealth.

A public counsel was then held, in which affairs of importance were discussed and determined. A register was appointed to record the transactions of the council. This assembly had two presidents, who were nominated alternately by the different towns. But instead of two presidents, they soon elected but one. Many neighbouring towns which admired the constitution of this republic, founded on equality, liberty, the love of justice, and of the public good, were incorporated with the Achæans, and admitted to the full enjoyment of their laws and privileges.—The arms which the Achæans chiefly used were slings. They were trained to the art from their infancy, by slinging from a great distance, at a circular mark of a moderate circumference. By long practice they took so nice an aim, that they were sure, not only to hit their enemies on the head, but on any part of the face they chose. Their slings were of a different kind from those of the Balearians, whom they far surpassed in dexterity.

ACHÆI, ACHÆANS, the inhabitants of Achaia Propria. In Livy, the people of Greece; for the most part called *Achivi*, by the Roman poets. In Homer, the general name for Grecians. See ACHÆANS.

ACHÆORUM PORTUS, (Pliny); now *Porto Buon*, a harbour of the Chersonesus Taurica, on the Euxine: Another near Sigæum, into which the Xanthus, after being joined by the Simois, falls.

ACHÆMENES, according to Herodotus, was grandfather of Cambyses, and great-grandfather of Cyrus the first, king of Persia. Most of the commentators of Horace are of opinion, that the Achæmenes whom that poet mentions, ode xii. of his 2d book, was one of the Persian monarchs; but, if that were true, he must have reigned before the Medes subdued the Persians; for we do not hear of any king of that name from the time that the Persians founded that great monarchy, which is looked upon as the second universal one. However this be, the epithet *Achæmenians* is frequently given to the Persians, in the old Latin poets.

ACHÆMENES, son of Darius I. king of Persia, and brother of Xerxes, had the government of Egypt bestowed on him, after Xerxes had forced the Egyptians to return to their allegiance. He some time after commanded the Egyptian fleet in the celebrated expedition which proved so fatal to all Greece. The Egyptians having again taken up arms after the death of Xerxes, Achæmenes was sent into Egypt to suppress the rebellion; but was vanquished by Inarus, chief of the rebels, succoured by the Athenians.

ACHÆUS, cousin-german to Seleucus Ceraunus and Antiochus the Great, kings of Syria, became a very powerful monarch, and enjoyed the dominions he had usurped for many years; but at last he was punished for his usurpations in a dreadful manner, in the 140th year of Rome, as related by Polybius*.

ACHAIA, a name taken for that part of Greece which Ptolemy calls *Hellas*; the younger Pliny, *Græcia*; now called *Livadia*: bounded on the north by Thessaly, the river Sperchius, the Sinus Maliacus, and Mount Oëta; on the west by the river Achelous; on the east, turning a little to the north, it is washed by the Archipelago, down to the promontory of Sunium; on the south, joined to Peloponnesus, or the Morea, by the isthmus of Corinth, five miles broad.

Achæi
||
Achaia.

* Lib. viii.

Achaia
|
Acheen

ACHAIA Propria, anciently a small district in the north of Peloponnesus, running westward along the bay of Corinth, and bounded on the west by the Ionian sea, on the south by Elis and Arcadia, and on the east by Sicyonia: inhabitants, the *Achaean*, properly so called; its metropolis, *Patrae*. It is now called *Komania Alia*, in the Morea.

Achaia was also taken for all those countries that joined in the Achean league, reduced by the Romans to a province. Likewise for Peloponnesus.

ACHAIAE Presbyteri, or the Presbyters of Achaia, were those who were present at the martyrdom of St Andrew the apostle, A. D. 59; and are said to have written an epistle in relation to it. Bellarmin, and several other eminent writers in the church of Rome, allow it to be genuine; while Du Pin, and some others, expressly reject it.

ACHAIUS, son of Ethwin, was raised to the crown of Scotland, A. D. 788. The emperor Charlemagne sent an embassy to this prince to request an alliance with him against the English, whose pirates so infested the seas, that the merchants could not carry on their trade. This alliance was concluded in France upon conditions so advantageous to the Scots, that Achaius, to perpetuate the memory of it, added to the arms of Scotland a double field sowed with lilies. He died in 819.

ACHALALACTLI, in *Ornithology*, a species of king's-fisher. See *ALCENO*, *ORNITHOLOGY Index*.

ACHAN, the son of Carmi, of the tribe of Judah, at the taking of Jericho concealed two hundred shekels of silver, a Babylonish garment, and a wedge of gold, contrary to the express command of God. This sin proved fatal to the Israelites, who were repulsed at the siege of Ai. In this dreadful exigence, Joshua prostrated himself before the Lord, and begged that he would have mercy upon his people. Achan was discovered by casting lots, and he and his children were stoned to death. This expiation being made, Ai was taken by stratagem. Joth. vii. 8, 9.

ACHANE, an ancient Persian corn measure, containing 45 Attic medimni.

ACHARACA, anciently a town of Lydia, situated between Tralles and Nysa; in which were the temple of Pluto, and the cave Charonium, where patients slept in order to obtain a cure.

ACHAT, in *Law*, implies a purchase or bargain. And hence probably purveyors were called *Achators*, from their making bargains.

ACHATES, the companion of *Aeneas*, and his most faithful friend, celebrated in *Virgil*.

ACHATES, in *Natural History*, the same as *AGATE*.

ACHATES, in *Ancient Geography*, a river of Sicily, now the *Drillo*; which runs from north to south, almost parallel with, and at no great distance from, the *Gela*; and rises in the north of the territory of *Noto*. It gave name to the *achates*, or *agate*, said to be first found there.

ACHAZIB, or *ACHZIB*, in *Ancient Geography*, a town of Galilee, in the tribe of *Asser*, nine miles from *Ptolemais*.—Also a town in the more southern parts of the tribe of *Judah*.

ACHEEN, *ACHE'*, or *ACHEN*, a kingdom of Sumatra in the East Indies, situated on the north western part of the island.

Acheen

The capital is situated on a river which empties itself near the north-west point, or Acheen head, about two miles from the mouth. It lies in a wide valley, formed like an amphitheatre by two lofty ranges of hills. The river is not large, and by emptying itself in several channels is rendered very shallow at the bar. In the dry monsoon, it will not admit boats of any burthen, much less large vessels, which lie without, in the road formed by the islands off the point. Though no longer the great mart of eastern commodities, it still carries on a considerable trade with the natives of that part of the coast of Indoitan called *Tellinga*, who supply it with the cotton goods of their country, and receive in return, gold dust, Japan wood, betel-nut, patch-leaf, a little pepper, sulphur, camphire, and benzoin. The country is supplied with Bengal opium, and also with iron, and many other articles of merchandise, by the European traders.

Acheen is esteemed, comparatively, healthy, being more free from woods and swamps than most other portions of the island; and the fevers and dysenteries to which these are supposed to give occasion, are there said to be uncommon. The soil is light and fertile; and the products, beside those already enumerated as articles of export trade, and a variety of fine fruits, are chiefly rice and cotton. There is likewise some raw silk procured in the country, of very inferior quality. Gold dust is collected in the mountains near Acheen, but the greatest part is brought from the southern parts of Nalaboo and Sofoo. The sulphur is gathered from a volcano mountain in the neighbourhood, which supplies their own consumption for the manufacture of gunpowder, and admits of a large exportation.

In their persons, the Achenese differ from the rest of the Sumatrans, being taller, stouter, and darker complexioned. They appear not to be a genuine people; but are thought, with great appearance of reason, to be a mixture of *Battas*, *Malays*, and *Moors*, from the west of India. In their dispositions they are more active and industrious than their neighbours: they possess more penetration and sagacity; have more general knowledge; and, as merchants, they deal upon a more extensive and liberal footing. Their religion is Mahometanism; and having a great number of mosques and priests, its forms and ceremonies are strictly observed.

The appearance of the town and the nature of the buildings, are much the same as are found in the generality of Malay bazars, excepting that the superior wealth of this place has occasioned a great number of public edifices, but without the smallest pretensions to magnificence. The king's palace, if it deserves the appellation, is a very rude and uncouth piece of architecture, designed to resist the force of an enemy, and surrounded for that purpose by strong walls, but without any regular plan, or view to the modern system of military attack. The houses in common are built of bamboos and rough timber, and raised some feet from the ground on account of the place being overflowed in the rainy season.

A considerable fabric of a thick species of cotton cloth, and of stuff for the short drawers worn both by *Malays* and *Achenese*, is established here, and supplies an extensive demand. They weave also very handsome silk pieces, of a particular form, for that part of the dress which is called by the *Malays cayen ferrong*. The

Acheen.

The Acheene are expert and bold navigators, and employ a variety of vessels, according to the voyages they undertake, and the purposes for which they design them. The river is covered with a multitude of fishing lampans or canoes, which go to sea with the morning breeze, and return in the afternoon, with the sea wind, full laden.

Having no convenient coins, though most species of money will be taken here at a valuation, they commonly make their payments in gold duit, and for that purpose are all provided with scales or small steel yards. They carry their gold about them, wrapped up in pieces of bladder, and often purchase to so small an amount, as to make use of grain or seeds for weights,

The monarchy is hereditary; and the king usually maintains a guard of 100 fepoys about his palace.

According to Mr Marfdon, "the grand council of the nation consists of the king or *sultan*, four *oolooballangs*, and eight of a lower degree, who sit on his right hand, and sixteen *cajorangs*, who sit on his left. At the king's feet sits a woman, to whom he makes known his pleasure: by her it is communicated to an eunuch, who sits next to her; and by him to an officer named *cajorang gondong*, who then proclaims it aloud to the assembly. There are also present two other officers, one of whom has the government of the *bazar* or market, and the other the superintending and carrying into execution the punishment of criminals. All matters relative to commerce and the customs of the port come under the jurisdiction of the *shabandar*, who performs the ceremony of giving the *chap* or license for trade; which is done by lifting a golden-hafted creese over the head of the merchant who arrives, and without which he dares not to land his goods. Presents, the value of which are become pretty regularly ascertained, are then sent to the king and his officers. If the stranger be in the style of an ambassador, the royal elephants are sent down to carry him and his letters to the monarch's presence; these being first delivered into the hands of an eunuch, who places them in a silver dish, covered with rich silk, on the back of the largest elephant, which is provided with a machine (*bouder*) for that purpose. Within about an hundred yards of an open hall where the king sits, the cavalcade stops, and the ambassador dismounts, and makes his obeisance by bending his body, and lifting his joined hands to his head. When he enters the palace, if an European, he is obliged to take off his shoes; and having made a second obeisance, is seated upon a carpet on the floor, where *betel* is brought to him. The throne was some years ago of ivory and tortoiseshell; and when the place was governed by queens, a curtain of gauze was hung before it, which did not obstruct the audience, but prevented any perfect view. The stranger, after some general discourse, is then conducted to a separate building, where he is entertained with the delicacies of the country by the officers of state, and in the evening returns in the manner he came, surrounded by a prodigious number of lights. On high days (*aree ryab*) the king goes in great state, mounted on an elephant richly caparisoned, to the great mosque, preceded by his *oolooballangs*, who are armed nearly in the European manner."

The country under the immediate jurisdiction of Acheen, is divided into three districts, named *Duo-*

Acheen. Achelous.

pooloo duo, *Duo-pooloo leemo*, and *Duo-pooloo anam*. Each district is governed by a *pangleemo*, and under him an *imam* and four *pangeeches* to each mosque.

"Acheen has ever been remarkable for the severity with which crimes are punished by their laws: the same rigour still subsists, and there is no commutation admitted, as is regularly established in the southern countries. There is great reason, however, to conclude, that the poor alone experience the rod of justice; the nobles being secure from retribution in the number of their dependants. Petty theft is punished by suspending the criminal from a tree, with a gun or heavy weight tied to his feet; or by cutting off a finger, a hand, or leg, according to the nature of the theft. Many of these mutilated and wretched objects are daily to be seen in the streets. Robbery on the highway and house-breaking are punished by drowning, and afterwards exposing the body on a stake for a few days. If the robbery is committed upon an *imam* or priest, the sacrilege is expiated by burning the criminal alive. A man who is convicted of adultery is seldom attempted to be screened by his friends, but is delivered up to the friends and relations of the injured husband. These take him to some large plain, and forming themselves in a circle, place him in the middle. A large weapon called a *gadoobong*, is then delivered to him by one of his family; and if he can force his way through those who surround him, and make his escape, he is not liable to further prosecution; but it commonly happens that he is instantly cut to pieces. In this case his relations bury him as they would a dead buffalo, refusing to admit the corpse into their house, or to perform any funeral rites." These discouragements to vice might seem to bespeak a moral and virtuous people: yet all travellers agree in representing the Acheene as one of the most dishonest and flagitious nations of the East.

Acheen was visited by the Portuguese in 1509, only 12 years after they had discovered the passage to the East Indies by the Cape of Good Hope. They made various attempts to establish themselves in the country, but were expelled with disgrace. See SUMATRA.

ACHELOUS, in *Fabulous History*, wrestled with Hercules, for no less a prize than Deianira, daughter of King Ceneus: but as Achelous had the power of assuming all shapes, the contest was long dubious: at last, as he took that of a bull, Hercules tore off one of his horns; so that he was forced to submit, and to redeem it by giving the conqueror the horn of Amalthea, the same with the Cornucopie or horn of plenty; which Hercules having filled with a variety of fruits, consecrated to Jupiter. Some explain this fable, by saying, That Achelous is a winding river of Greece, whose stream was so rapid, that it roared like a bull, and overflowed its banks; but Hercules, by bringing it into two channels, broke off one of the horns, and so restored plenty to the country. See the next article.

ACHELOUS, a river of Acarnania; which rises in Mount Pindus, and, dividing Ætolia from Acarnania, falls from north to south into the Sinus Corinthiacus. It was formerly called *Thoas* from its impetuosity, and *king of rivers*, (Homer). The epithet *Achelous* is used for *Aqueus*, (Virgil); the ancients calling all water *Achelous*, especially in oaths, vows, and sacrifices, according to Ephorus: Now called *Alpro Potamo*. Rivers are by the ancient poets called *Tauriformes*: either

Acheri
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Achiar.

either from the bellowing of their waters, or from their ploughing the earth in their course: Hercules, refraining by dikes and mounds the inundations of the *Achelous*, is said to have broken off one of his horns, and to have brought back plenty to the country. See the preceding article.

ACHERI, LUKE D', a learned Benedictine of the congregation of St Maur, was born at St Quintin, in Picardy, in 1609; and made himself famous by printing several works, which till then were only in manuscript: particularly, the epistle attributed to St Barnabas; the works of Lanfranc, archbishop of Canterbury; a collection of scarce and curious pieces, under the title of *Spicilegium*, i. e. Gleanings, in thirteen volumes, quarto. The prefaces and notes, which he annexed to many of these pieces, show him to have been a man of genius and abilities. He had also some share in the pieces inserted in the first volumes of *The acts of the Saints of the order of St Benedict*; the title whereof acquaints us that they were collected and published by him and Father Mabillon. After a very retired life, till the age of 73, he died at Paris the 29th of April 1685, in the abbey of St Germain in the Fields, where he had been librarian.

ACHERNER, or ACHARNER, a star of the first magnitude in the southern extremity of the constellation ERIDANUS, but invisible in our latitude.

ACHERON, in *Mythology*, a river of Epirus. The poets feigned it to have been the son of Ceres, whom she hid in hell for fear of the Titans, and turned into a river, over which souls departed were ferried in their way to Elysium.

ACHERON, in *Ancient Geography*, a river of Thesprotia, in Epirus; which, after forming the lake Acherusia, at no great distance from the promontory of Chimerium, falls into the sea to the west of the Sinus Ambracius, in a course from north to south.

ACHERON, or ACHEROS, a river of the Bruttii in Italy, running from east to west; where Alexander king of Epirus was slain by the Lucani, being deceived by the oracle of Dodona, which bade him beware of Acheron.

ACHARSET, an ancient measure of corn, conjectured to be the same with our quarter, or eight bushels.

ACHERUSIA PALUS, a lake between Cumæ and the promontory Misenum, now *il Lago della Collucia*. (Cluverius). Some confound it with the *Lacus Lucrinus*, and others with the *Lacus Averni*. But Strabo and Pliny distinguish them. The former takes it to be an effusion, exundation, or washes of the sea, and therefore called by Lycophron, *Αχηρυσια χυσις*.—Also a lake of Epirus, through which the Acheron runs.—There is also an *Acherusia*, a peninsula of Bithynia on the Euxine, near Heraclea; and a cave there of the same name, through which Hercules is fabled to have descended to hell to drag forth Cerberus.

ACHIAR, is a Malayan word, which signifies all sorts of fruits and roots pickled with vinegar and spice. The Dutch import from Batavia all sorts of achiar, but particularly that of BAMBOO, a kind of cane, extremely thick, which grows in the East Indies. It is preserved there, whilst it is still green, with very strong vinegar and spice; and is called *bamboo achiar*. The name changes according to the fruit with which the achiar is made.

ACHICOLUM, is used to express the *fernix, tholus*, or *sudatorium* of the ancient baths; which was a hot room where they used to sweat. It is also called *archibolus*.

ACHILLÆA, YARROW, MILFOIL, NOSEBLEED, or SNEEZWORT. See BOTANY *Index*.

ACHILLEID, ACHILLEIS, a celebrated poem of Statius, in which that author proposed to deliver the whole life and exploits of Achilles; but being prevented by death, he has only treated of the infancy and education of his hero. See STATIUS.

ACHILLES, one of the greatest heroes of ancient Greece, was the son of Peleus and Thetis. He was a native of Phthia, in Thessaly. His mother, it is said, in order to consume every mortal part of his body, used to lay him every night under live coals, anointing him with ambrosia, which preserved every part from burning but one of his lips, owing to his having licked it. She dipped him also in the waters of the river Styx; by which his whole body became invulnerable, except that part of his heel by which she held him. But this opinion is not universal, nor is it a part of his character as drawn by Homer; for in the *Iliad* (B. xxi. 161.) he is actually wounded in the right arm, by the lance of Asteropus, in the battle near the river Scamander. Thetis afterwards intrusted him to the care of the centaur Chiron, who, to give him the strength necessary for martial toil, fed him with honey and the marrow of lions and wild boars. To prevent his going to the siege of Troy, she disguised him in female apparel, and hid him among the maidens at the court of King Lycomedes: but Ulysses discovering him, persuaded him to follow the Greeks. Achilles distinguished himself by a number of heroic actions at the siege. Being disgusted, however, with Agamemnon for the loss of Briseis, he retired from the camp. But returning to avenge the death of his friend Patroclus, he slew Hector, fastened his corpse to his chariot, and dragged it round the walls of Troy. At last Paris, the brother of Hector, wounded him in the heel with an arrow, while he was in the temple treating about his marriage with Philoxena, daughter of King Priam. Of this wound he died, and was interred on the promontory of Sigæum; and after Troy was taken, the Greeks sacrificed Philoxena on his tomb, in obedience to his desire, that he might enjoy her company in the Elysian fields. It is said, that Alexander, seeing this tomb, honoured it by placing a crown upon it; at the same time crying out, that "Achilles was happy in having, during his life, such a friend as Patroclus; and, after his death, a poet like Homer." Achilles is supposed to have died 1183 years before the Christian era.

ACHILLES TATIUS. See TATIUS.

Tendo ACHILLIS, in *Anatomy*, is a strong tendinous cord formed by the tendons of several muscles, and inserted into the os calcis. It has its name from the fatal wound Achilles is said to have received in that part from Paris the son of Priam.

ACHILLINI, ALEXANDER, born at Bologna, and doctor of philosophy in that university. He flourished in the 15th and 16th centuries, and by way of eminence was styled the Great Philosopher. He was a steadfast follower and accurate interpreter of Averroes upon Aristotle, but most admired for his acuteness and strength of arguing in private and public disputations.

He.

Achicolum
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Achillini.

Achillini
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Achmet.

He made a surprising quick progress in his studies, and was very early promoted to a professorship in the university; in which he acquitted himself with so much applause that his name became famous throughout all Italy. He continued at Bologna till the year 1506; when the university of Padua made choice of him to succeed Antonio Francatiano in the first chair of philosophy, and his fame brought vast numbers of students to his lectures at Padua: but the war, wherein the republic of Venice was engaged against the league of Cambray, putting a stop to the lectures of that university, he withdrew to his native country, where he was received with the same marks of honour and distinction as before, and again appointed professor of philosophy in Bologna. He spent the remainder of his life in this city, where he died, and was interred with great pomp in the church of St Martin the Great, which belongs to the Carmelite friars. Jovius, who knew Achillini, and heard his lectures, says, that he was a man of such exceeding simplicity, and so unacquainted with address and flattery, that he was a laughing stock to the pert and faucy young scholars, although esteemed on account of his learning. He wrote several pieces on philosophical subjects, which he published, and dedicated to John Bentivogli.

ACHILLINI, *Claudius*, grandson of the former, read lectures at Bologna, Ferrara, and Parma; where he was reputed a great philosopher, a learned divine, an excellent lawyer, an eloquent orator, a good mathematician, and an elegant poet. He accompanied Cardinal Ludovino, who went as legate into Piedmont; but being afterward neglected by this cardinal, when he became pope under the name of Gregory XV. he left Rome in disgust, and retired to Parma; where the duke appointed him professor of law, with a good salary. A canzone which he addressed to Louis XIII. on the birth of the Dauphin, is said to have been rewarded by Cardinal Richlieu, with a gold chain of the value of 1000 crowns. He published a volume of Latin letters, and another of Italian poems, which gained him great reputation. He died in 1640, aged 66.

ACHIOTTE, or АЧИОТЪ, a foreign drug, used in dying, and in the preparation of chocolate. It is the same with the substance more usually known by the name of АННОТТО. See ВИСА, BOTANY *Index*.

ACHIROPÆTOS, a name given by ancient writers to certain miraculous pictures of Christ and the Virgin, supposed to have been made without hands.—The most celebrated of these is the picture of Christ, preserved in the church of St John Lateran at Rome; said to have been begun by St Luke, but finished by the ministry of angels.

ACHMET, son of Seerim, an Arabian author, has left a book concerning the interpretation of dreams according to the doctrine of the Indians, Persians, and Egyptians, which was translated into Greek and Latin. The original is now lost. He lived about the 4th century.

ACHMET I. emperor of the Turks, the third son and successor of Mahomet III. ascended the throne before he reached the age of fifteen. During the period of his reign, the Turkish empire enjoyed at one time great prosperity, and at another was depressed by adversity. The Asiatic rebels, who took refuge in Persia, involved the two empires in a war, during which the Turks

lost Bagdad, to recover which every effort proved unsuccessful. In his reign Transylvania and Hungary were the scenes of war between the Turks and Germans. In addition to the calamities and distresses of war abroad, and internal tumults and broils, a pretender to his throne disturbed his repose, and made attempts on his life. He was much devoted to amusements; and spent his time chiefly in the haram and in the sports of the field. His seraglio consisted of 3000 women; and his hunting establishment was composed of 40,000 falcons, and an equal number of huntsmen, in different parts of his dominions. He expended great sums of money in building, and particularly on a magnificent mosque which he erected in the Hippodrome. Achmet was less cruel than some of his predecessors; but he was haughty and ambitious. He died in 1617 at the age of 29. His three sons successively ascended the throne after him. (*Gen. Biog.*)

ACHMET II. emperor of the Turks, son of Sultan Ibrahim, succeeded his brother Solyman in 1691. The administration of affairs during his reign was feeble and unsettled. The Ottoman territory was overrun by the imperialists; the Venetians seized the Morea, took the isle of Chios, and several places in Dalmatia; and the Arabs attacked and plundered a caravan of pilgrims, and even laid siege to Mecca. Though he never discovered the vigour and sagacity that are essentially requisite in the character of a sovereign, in private life he was mild, devout, and inoffensive. He was fond of poetry and music; and to those about his person, he was cheerful and amiable. He died in 1695 at the age of 50.

ACHMET III. emperor of the Turks, son of Mahomet IV. succeeded his brother Mustapha II. who was deposed in 1703. After he had settled the discontents of the empire, his great object was to amass wealth. With this view he debased the coin, and imposed new taxes. He received Charles XII. of Sweden, who took refuge in his dominions, after the battle of Pultowa in 1709, with great hospitality; and, influenced by the sultana mother, he declared war against the Czar Peter, Charles's formidable rival. Achmet recovered the Morea from the Venetians; but his expedition into Hungary was less fortunate, for his army was defeated by Prince Eugene at the battle of Peterwaradin in 1716. As the public measures of Achmet were influenced by ministers and favourites, the empire during his reign was frequently distracted by political struggles and revolutions. The discontent and sedition of his soldiers at last drove him from the throne. He was deposed in 1730, and succeeded by his nephew Mahomet V. He was confined in the same apartment which had been occupied by his successor previous to his elevation to the throne, and died of an apoplexy in 1736, at the age of 74. The intentions of this prince, it is said, were upright; but his talents were moderate, never discovering that vigour of mind and steadiness of action which are so necessary in the character of a sovereign. Excessive confidence in his vizier diminished the splendour of his reign, and probably tended to shorten the period of it. (*Gen. Biog.*)

ACHMET GEDUC, a famous general under Mahomet II. and Bajazet II. in the 15th century. When Mahomet II. died, Bajazet and Zezan both claimed the throne: Achmet sided with the former, and by his bravery

Achmet.

Achmet-
fchet,
Achmim.

bravery and conduct fixed the crown on his head. But Bajazet took away his life; shining virtue being always an unpardonable crime in the eyes of a tyrant.

ACHMETSCHET, a town of the peninsula of the Crimea, the residence of the sultan Galga, who is eldest son of the khan of Tartary. E. Long. 52. 20. N. Lat. 45. 35.

ACHMIM, a large town of Upper Egypt, situated on the eastern bank of the Nile. 'One admires there (says Abulfeda, as quoted by M. Savary) a temple which is comparable to the most celebrated monuments of antiquity. It is constructed with stones of a surprising size, on which are sculptured innumerable figures.' Though this town be fallen from its ancient splendour, it is still one of the most beautiful of Upper Egypt. According to M. Savary, an Arab prince commands there, and the police is well attended to. The streets are wide and clean, and commerce and agriculture flourish. It has a manufactory of cotton stuffs, and pottery, which are conveyed over all Egypt. It is the fame that Herodotus calls *Chennis*, and Strabo *Panopolis*, or the city of Pan, who was worshipped there. Herodotus says, that Perseus was a native of this city, and that his descendants had established festivals there in his honour. It has lost its ancient edifices, and much of its extent; the ruins of the temple, described by Abulfeda, being without its limits to the north. Nothing remains of it but some stones, of such magnitude that the Turks have not been able to move them. They are covered with hieroglyphics. On one of them are traced four concentric circles, in a square. The innermost of these contains a sun. The two succeeding ones, divided into 12 parts, contain, one, 12 birds, the other, 12 animals, almost effaced, which appear to be the signs of the zodiac. The fourth has no divisions, and presents 12 human figures: which Mr Savary imagines to represent the 12 gods, the 12 months of the year, and the 12 signs of the zodiac. The Egyptians, says Herodotus, were the first who divided the year into 12 months, and employed the names of the 12 gods. The four seasons occupy the angles of the square, on the side of which may be distinguished a globe with wings. M. Savary thinks it probable that this stone belonged to a temple dedicated to the sun, that the whole of these hieroglyphics mark his passage into the signs of the zodiac, and his course, whose revolution forms the year. The columns of this temple have been partly broken to make lime and millstones. Some of them have been transported into one of the mosques of Achmim, where they are placed without taste; others are heaped up in the squares of the town.

M. Savary tells us of a serpent which is worshipped here, and is the wonder of the country. "Upwards of a century ago (says he), a religious Turk called *Scheik Haridi* died here. He passed for a saint among the Mahometans; who raised a monument to him, covered with a cupola, at the foot of the mountain. The people flocked from all parts to offer up their prayers to him. One of their priests, profiting by their credulity, persuaded them that God had made the soul of Sheikh Haridi pass into the body of a serpent. Many of these are found in the Thebas, which are harmless; and he had taught one to obey his voice. He appeared with his serpent, dazzled the vulgar by his surprising tricks, and pretended to cure all disorders.

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Some lucky instances of success, due to nature alone, and sometimes to the imagination of the patients, gave him great celebrity. He soon confined his serpent Haridi to the tomb, producing him only to oblige princes and persons capable of giving him a handsome recompense. The successors of this priest, brought up in the same practices, found no difficulty in giving sanction to so advantageous an error. They added to the general persuasion of his virtue that of his immortality. They had the boldness even to make a public proof of it. The serpent was cut in pieces in presence of the Emir, and placed for two hours under a vase. At the instant of lifting up the vase, the priests, no doubt, had the address to substitute one exactly resembling it. A miracle was proclaimed, and the immortal Haridi acquired a fresh degree of consideration. This knavery procures them great advantages. The people flock from all quarters to pray at this tomb; and if the serpent crawls out from under the stone, and approaches the suppliant, it is a sign that his malady will be cured. It may be imagined, that he does not appear till an offering has been made proportioned to the quality and riches of the different persons. In extraordinary cases, where the sick person cannot be cured without the presence of the serpent, a *pure virgin* must come to solicit him. To avoid inconveniences on this head, they take care to choose a *very young girl indeed*. She is decked out in her best clothes, and crowned with flowers. She puts herself in a praying attitude; and as the priests are inclined, the serpent comes out, makes circles round the young suppliant, and goes and reposes on her. The virgin, accompanied by a vast multitude, carries him in triumph amidst the general acclamation. No human reasoning would persuade these ignorant and credulous Egyptians that they are the dupes of a few impostors; they believe in the serpent Haridi as firmly as in the prophet."

ACHONRY, a small town of Ireland, in the province of Connaught and county of Sligo, seated on the river Shannon.

ACHOR, a valley of Jericho, lying along the river Jordan, not far from Gilgal; so called from Achai, the troubler of Israel, being there stoned to death.

ACHOR, in *Medicine*, a species of HERPES.

ACHOR, in *Mythology*, the god of flies; to whom, according to Pliny, the inhabitants of Cyrene sacrificed, in order to obtain deliverance from the insects and the disorders occasioned by them.

ACHRADINA, in *Ancient Geography*, one of the four cities or divisions of Syracuse, and the strongest, largest, and most beautiful part of it; separated by a very strong wall from the outer town, *Tycho* and *Neapolis*. It was adorned with a very large forum, with beautiful porticoes, a most elegant prytaneum, a spacious senate-house, and a superb temple of Jupiter Olympius.

ACHRAS, or SAPOTA PLUM. See BOTANY Index.

ACHROMATIC, an epithet expressing want of colour. The word is Greek, being compounded of a privative, and *χρῶμα*, colour. This term was first introduced into astronomy by De la Lande.

ACHROMATIC Telescopes, are telescopes contrived to remedy the aberrations in colours. They were invent-

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Achroma-
tic.

Achteling ed by Mr John Dollond, optician, and have been since improved by his son and others. See ABERRATION. —A more particular account of the invention and construction of these instruments will be found under OPTICS.

ACHTELING, a measure for liquids used in Germany. Thirty-two *achtelings* make a *beemer*; four *scilims* or *scilins* make an *achteling*.

ACHYR, a strong town and castle of the Ukrain, subject to the Russians since 1667. It stands on the river Uorsklo, near the frontiers of Russia, 127 miles west of Kiow. E. Long. 36. O. N. Lat. 49. 32.

ACHYRANTHES, in *Botany*. See *BOTANY Index*.

ACICANTHERA, in *Botany*, the trivial name of a species of RHEXIA.

ACICULÆ, the small pikes or prickles of the hedgehog, echinus marinus, &c.

ACIDALIUS, VALENS, would, in all probability, have been one of the greatest critics in those latter ages, had he lived longer to perfect those talents which nature had given him. He was born at Witstock, in Brandenburg; and having visited several academies in Germany, Italy, and other countries, where he was greatly esteemed, he afterwards took up his residence at Breslaw, the metropolis of Silesia. Here he remained a considerable time, in expectation of some employment; but nothing offering, he turned Roman Catholic, and was chosen rector of a school at Nieffa. It is related, that about four months after, as he was following a procession of the host, he was seized with a sudden palsy; and being carried home, expired in a very short time. But Thuanus tells us, that his excessive application to study was the occasion of his untimely death; and that his sitting up in the night composing his Conjectures on Plautus, brought upon him a distemper which carried him off in three days, on the 25th of May 1595, being just turned of 28. He wrote a Commentary on Quintus Curtius; also, Notes on Tacitus, on the twelve Panegyrics; besides speeches, letters, and poems. His poetical pieces are inserted in the *Delicie* of the German poets, and consist of epic verses, odes, and epigrams. A little work printed in 1595, under the title of *Mulieres non esse homines*, "That women were not of the human species," was falsely ascribed to him. But the fact was, that Acidalius happening to meet with the manuscript, and thinking it very whimsical, transcribed it, and gave it to the bookseller, who printed it. The performance was highly censured, so that the bookseller being seized, he discovered the person who gave him the manuscript, and a terrible outcry was made against Acidalius. A story goes, that being one day to dine at a friend's house, there happened to be several ladies at table; who supposing him to be the author, were moved with so much indignation, that they threatened to throw their plates at his head. Acidalius, however, ingeniously diverted their wrath. In his opinion, he said the author was a judicious person, the ladies being certainly more of the species of *angels* than of *men*.—Mr Baillet has given him a place among his *Enfans Celebres*; and says, that he wrote a comment upon Plautus when he was but 17 or 18 years old, and that he composed several Latin poems at the same age.

ACIDALUS, a fountain in Orchomenus, a city of

Bœotia, in which the Graces, who are sacred to Venus, bathed. Hence the epithet *Acidalia*, given to Venus. (Virgil.)

ACIDITY, that quality which renders bodies acid. ACIDOTON, in *Botany*, the trivial name of a species of ADELIA.

ACIDS, in *Chemistry*, a class of substances which are distinguished by the following properties:

1. When applied to the tongue, they excite that sensation which is called *sour* or *acid*.

2. They change the blue colours of vegetables to a red. The vegetable blues employed for this purpose are generally tincture of litmus and syrup of violets or of radishes, which have obtained the name of *reagents* or *tests*. If these colours have been previously converted to a *green* by alkalies, the acids restore them again.

3. They unite with water in almost any proportion.

4. They combine with all the alkalies, and most of the metallic oxides and earths, and form with them those compounds which are called *salts*.

It must be remarked, however, that every acid does not possess all these properties; but all of them possess a sufficient number of them to distinguish them from other substances. And this is the only purpose which artificial definition is meant to answer.

The acids are by far the most important class of bodies in chemistry. It was by their means indeed, by studying their properties, and by employing them as instruments in the examination of other bodies, that men of science laid the foundation of chemistry, and brought it to that state in which we find it at present. The nature and composition of acids, therefore, became a very important point of discussion, and occupied the attention of the most eminent cultivators of the science.

Paracelsus believed that there was only one acid principle in nature which communicated taste and solubility to the bodies in which it was combined. Beccher embraced the same opinion; and added to it, that this acid principle was a compound of earth and water, which he considered as two elements. Stahl adopted the theory of Beccher, and endeavoured to prove that his acid principle is sulphuric acid; of which, according to him, all the other acids are mere compounds. But his proofs were only conjectures or vague experiments, from which nothing could be deduced. Nevertheless, his opinion, like every other which he advanced in chemistry, continued to have supporters for a long time, and was even countenanced by Macquer. At last its defects began to be perceived; Bergman and Schcele declared openly against it; and their discoveries, together with those of Lavoisier, demonstrated the falsehood of both parts of the theory, by shewing that sulphuric acid does not exist in the other acids, and that it is not composed of water and earth, but of sulphur and oxygen.

The opinion, however, that acidity is owing to some principle common to all the salts, was not abandoned. Wallerius, Meyer, and Sage, had advanced different theories in succession about the nature of this principle; but as they were founded rather on conjecture and analogy than direct proof, they obtained but few advocates. At last Mr Lavoisier, by a number of ingenious and accurate experiments, proved that several combustible

Acidity
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Acids.

Acids.

combustible substances, when united with oxygen, form acids; that a great number of acids contain oxygen; and that when this principle is separated from them, they lose their acid properties. He concluded, therefore, that the acidifying principle is oxygen, and that acids are nothing else but combustible substances combined with oxygen, and differing from one another according to the nature of the combustible base.

This conclusion, as far as regards the greater number of acids, is certainly true. All the simple combustibles, except hydrogen, are convertible into acids; and these acids are composed of oxygen and the combustible body combined: this is the case also with four of the metals. It must not, however, be admitted without some limitation.

1. When it is said that oxygen is the acidifying principle, it is not meant surely to affirm that oxygen possesses the properties of an acid, which would be contrary to truth; all that can be meant is, that it enters as a component part into acids, or that acids contain it as an essential ingredient.

2. But, even in this sense, the assertion cannot be admitted: for it is not true that oxygen is an essential ingredient in all acids, or that no body possesses the property of an acid unless it contains oxygen. Sulphurated hydrogen, for instance, possesses all the characters of an acid, yet it contains no oxygen.

3. When it is said that oxygen is the acidifying principle, it cannot be meant surely to affirm that the combination of oxygen with bodies produces in all cases an acid, or that whenever a body is combined with oxygen, the product is an acid; for the contrary is known to every chemist. Hydrogen, for instance, when combined with oxygen, forms not an acid, but water, and the greater number of metallic bodies form only oxides.

All that can be meant, then, when it is said that oxygen is the acidifying principle, is merely that it exists as a component part in the greater number of acids; and that many acids are formed by combustion, or by some equivalent process. The truth is, that the class of acids is altogether arbitrary; formed when the greater number of the bodies arranged under it were unknown, and before any precise notion of what ought to constitute the characteristic marks of an acid had been thought of. New bodies, when they were discovered, if they possessed any properties analogous to the known acids, were referred without scruple to the same class, how much soever they differed from them in other particulars. Hence we find, under the head of acids, bodies which have scarcely a single property in common except that of combining with alkalies and earths. What substance, for instance, can be more dissimilar than sulphuric, prussic and uric acids? Hence the difficulty of assigning the general characters of the class of acids, and the disputes which have arisen about the propriety of classing certain bodies among acids. If we lay it down as an axiom that oxygen is the acidifying principle, we must either include among acids a great number of bodies which have not the smallest resemblance to those substances which are at present reckoned acids, or exclude from the class several bodies which have the properties of acids in perfection. The class of acids being perfectly arbitrary, there can-

not be such a thing as an acidifying principle in the most extensive sense of the word.

The acids at present known amount to about 30; and all of them, eight excepted, have been discovered within these last 40 years. They may be arranged under two general heads: 1. Acids composed of two ingredients. 2. Acids composed of more than two component parts. (*Thomson's Chemistry.*) See CHEMISTRY.

ACIDULOUS, denotes a thing that is slightly acid; it is synonymous with the word *sub-acid*.

ACIDULÆ. Mineral waters that are brisk and sparkling without the action of heat are thus named; but if they are hot also they are called THERMÆ.

ACIDULATED, a name given to medicines that have an acid in their composition.

ACIDUM AEREUM, the fame with *fixed air*; or in modern chemistry, *carbonic acid*.

ACIDUM pingue, an imaginary acid, which some German chemists supposed to be contained in fire, and by combining with alkalies, lime, &c. to give them their caustic properties; an effect which is found certainly to depend on the loss of their carbonic acid.

ACILA, in *Ancient Geography*, a staple or mart town in Arabia Felix, on the Arabian gulf, from which, according to Pliny, the Scenitæ Sabæi fet sail for India. Now *Ziden*.

ACILISENE, in *Ancient Geography*, a district of the lesser Armenia towards the head of the Euphrates, having that river on the west, and on the south a river to which Xenophon and Pliny seem to have given the same name.

ACILIUS GLABRIO, MARCUS, consul in the year of Rome 562, and 211 years before the Christian era, distinguished himself by his bravery and conduct in gaining a complete victory over Antiochus the Great, king of Syria, at the straits of Thermopylæ in Thessaly, and on several other occasions. He built the temple of Piety at Rome, in consequence of a vow which he made before this battle. He is mentioned by Pliny, Valerius Maximus, and others.

ACINASIS, in *Ancient Geography*, a river of Asia, at the southern extremity of Colchis, which discharges itself into the Euxine sea, between the Bathys and the Ibis. It is mentioned by Arrian in his Periplus.

ACINIPPO, in *Ancient Geography*, a town of Bætica: its ruins, called *Ronda la Viega*, are to be seen near Arunda, in the kingdom of Granada.

ACINODENDRUM, in *Botany*, the trivial name of a species of MELASTOMA.

ACINOS, in *Botany*, the trivial name of a species of THYMUS. See BOTANY Index.

ACINUS, or ACINI, the small protuberances of mulberries, strawberries, &c. and by some applied to grapes. Generally it is used for those small grains growing in branches, after the manner of grapes, as *ligustrum*, &c.

ACIS, in *Mythology*, the son of Faëus and the nymph Simaethis, was a beautiful shepherd of Sicily, who being beloved by Galatea, Polyphemus the giant was so enraged, that he dashed out his brains against a rock; after which Galatea turned him into a river, which was called by his name.

The Sicilian authors say, that Acis was a king of this

Acknow-
ledgment

Acoemetæ.

this part of the island, who was slain by Polyphemus, one of the giants of Ætna, in a fit of jealousy.

ACIS, a river of Sicily, celebrated by the poets, running from a very cold spring, in the woody and shady foot of Mount Ætna, for the space of a mile eastward into the sea, along green and pleasant banks, with the speed of an arrow, from which it takes its name. Its waters are now impregnated with sulphureous vapours, though formerly they were celebrated for their sweetness and salubrity, and were held sacred by the Sicilian shepherds:

*Quique per Ætnæos Acis petit æquora fines,
Et dulci gratam Nereida perluit unda.* SIL. ITAL.

It is now called *Il Fiume Fredda, Aci, Iaci*, or *Chiaci*, according to the different Sicilian dialects: Antonine calls it *Acis*. It is also the name of a hamlet at the mouth of the *Acis*.

ACKNOWLEDGMENT, in a general sense, is a person's owning or confessing a thing; but, more particularly, is the expression of gratitude for a favour.

ACKNOWLEDGMENT-Money, a certain sum paid by tenants, in several parts of England, on the death of their landlords, as an acknowledgment of their new lords.

ACLIDES, in *Roman Antiquity*, a kind of missile weapon, with a thong affixed to it, by which it was drawn back. Most authors describe it as a sort of dart or javelin; but Scaliger makes it roundish or globular, and full of spikes, with a slender wooden stem to poise it by. Each warrior was furnished with two.

ACLOWA, in *Botany*, a barbarous name of a species of COLUTEA. It is used by the natives of Guinea, to cure the itch: They rub it on the body as we do unguents. See COLUTEA, BOTANY Index.

ACME, the top or height of any thing. It is usually applied to the maturity of an animal just before it begins to decline; and physicians have used it to express the utmost violence or crisis of a disease.

ACMELLA, in *Botany*, the trivial name of a species of SPILANTHUS. See BOTANY Index.

ACMODÆ, in *Ancient Geography*, seven islands in the British sea, supposed by some to be the Scilly islands, but by others those of Shetland near the Orkneys, on the northern coast of Scotland.

ACMONIA, and AGMONIA, in Peutinger's map, a town of Phrygia Major, now in ruins. The inhabitants are called *Acmonenses* by Cicero, and the city *Civitas Acmonensis*. Also a city of Dacia (Ptolemy), on the Danube, near the ruins of Trajan's bridge, built by Severus, and called *Severicum*; distant 12 German miles from Temeswar, to the south-east.

ACNIDA, VIRGINIAN HEMP. See BOTANY Index.

ACNUA, in *Roman Antiquity*, signified a certain measure of land, about an English rood, or fourth part of an acre.

ACO, in *Geography*, a town of Peru in South America. It is also the name of a river in Africa, which rises in the Abyssinian mountains, runs in a south-east course, and discharges itself into the Indian ocean.

ACOEMETÆ, or ACOEMETI, in *Church History*, or, Men who lived without sleep; a set of monks who chanted the divine service night and day in their places of worship. They divided themselves into three bodies, who alternately succeeded one another, so that the service in their churches was never interrupted.

This practice they founded upon the precept, *Pray without ceasing*. They flourished in the east about the middle of the 5th century. There are a kind of acoemeti still subsisting in the Romish church, viz. the religious of the holy sacrament, who keep up a perpetual adoration, some one or other of them praying before the holy sacrament day and night.

ACOLA, in *Ancient Geography*, a town in Media, on the borders of the Hyrcanian sea.

ACOLUTHI, or ACOLUTHISTS, in *Antiquity*, was an appellation given to those persons who were steady and immovable in their resolutions; and hence the Stoics, because they would not forsake their principles, nor alter their resolutions, acquired the title of *acoluti*. The word is Greek, and compounded of α privative, and $\kappa\omicron\lambda\upsilon\theta\omicron\varsigma$, way; as never turning from the original course.

ACOLUTHI, among the ancient Christians, implied a peculiar order of the inferior clergy in the Latin church, for they were unknown to the Greeks for above 400 years. They were next to the sub-deacon; and we learn from the fourth council of Carthage, that the archdeacon, at their ordination, put into their hands a candlestick with a taper, giving them thereby to understand that they were appointed to light the candles of the church; as also an empty pitcher, to imply that they were to furnish wine for the eucharist. Some think they had another office, that of attending the bishop wherever he went. The word is Greek, and compounded of α privative, and $\kappa\omicron\lambda\upsilon\omega$, to hinder or disturb.

ACOLYTHIA, in the *Greek church*, denotes the office or order of divine service; or the prayers, ceremonies, hymns, &c. whereof the Greek service is composed.

ACOMA, a town of New Mexico, seated on a hill, with a strong castle. To reach the town, you walk up 50 steps cut out of the rock. It is the capital of that province, and was taken by the Spaniards in 1599. W. Long. 104. 15. Lat. 35. 0.

ACOMAC, the name of a county in Virginia. It is on the eastern side of Chesapeake bay, on a slip of land, by the Virginians called the *eastern shore*. It contains 13,959 inhabitants.

ACOMINATUS, NICETAS, was secretary to Alexius Comnenus and to Isaac Angelus successively: he wrote a history from the death of Alexius Comnenus in 1118, where Zonaras ended his, to the year 1203; which has gone through many editions, and has been much applauded by the best critics.

ACONCROBA, in *Botany*, the indigenous name of a plant which grows wild in Guinea, and is in great esteem among the natives for its virtues in the small-pox. They give an infusion of it in wine. The leaves of this plant are opaque, and as stiff as those of the philyrea: they grow in pairs, and stand on short foot-stalks; they are small at each end, and broad in the middle; and the largest of them are about three inches in length, and an inch and a quarter in breadth in the middle. Like those of our bay, they are of a dusky colour on the upper side, and of a pale green underneath.

ACONITE. See ACONITUM, BOTANY Index.

Winter ACONITE. See HELLEBORUS, BOTANY Index.

ACONITI, in *Antiquity*, an appellation given to some

Acola
||
Aconiti.

Aconitum
||
Acofta.

some of the ΑΤΗΛΕΤÆ, but differently interpreted. Mercurialis understands it of those who only anointed their bodies with oil, but did not smear themselves over with dust, as was the usual practice.

ACONITUM, ACONITE, WOLFSBANE, or MONKSHOOD. See BOTANY Index.

ACONTIAS, in Zoology, an obsolete name of the anguis jaculus, or dart-snake, belonging to the order of amphibia serpentes. See ANGUIS.

ACONTIUM, ακοντιον, in Grecian Antiquity, a kind of dart or javelin, resembling the Roman pilum.

ACONTIUS, a young man of the island Cea, who having gone to Delos, to see the sacred rites which were performed there by a crowd of virgins in the temple of Diana, fell desperately in love with Cydippe; but not daring to ask her in marriage, on account of the meanness of his birth, insidiously threw down at her feet an apple, on which were inscribed these words, *Me tibi nupturam, (Felix eat omen,) Aconti, Juro, quam colimus, numina magna Deae.* Or according to others, *Juro tibi sacrae per mystica sacra Dianae, Me tibi venturam conitem, sponsamque futuram.* The virgin having taken up the apple, inadvertently read the words, and thus apparently bound herself by a promise; for by law, every thing uttered in that temple was held to be ratified. When her father, a little after, ignorant of what had happened, betrothed her to another man, she was suddenly seized with a fever. Whereupon Acontius sent her a letter, (expressed by Ovid, Ep. 20.) to persuade her that her fever was caused by Diana for not having fulfilled the promise which she had made to him in the temple of that goddess. Cydippe therefore resolved to comply with the wishes of Acontius, even against the inclination of her father. Her answer is the subject of Ovid's 21st epistle. (*Adam's Claf. Biog.*)

ACONTIUS, James, a philosopher, civilian, and divine, born at Trent in the 16th century. He embraced the reformed religion; and coming into England in the reign of Queen Elizabeth, he was favourably received and much honoured by that princess, which he acknowledges in a book dedicated to her. This work is his celebrated Collection of the Stratagems of Satan, which has been so often translated, and passed through so many editions.

ACORN, the fruit of the oak tree. See QUERCUS, BOTANY Index.

ACORN, in Sea Language, a little ornamental piece of wood, fashioned like a cone, and fixed on the uppermost point of the spindle, above the vane, on the mast-head. It is used to keep the vane from being blown off from the spindle in a whirlwind, or when the ship leans much to one side under sail.

ACORUS, CALAMUS AROMATICUS, SWEET FLAG, or SWEET RUSH. See BOTANY Index.

ACORUS, in the *Materia Medica*, a name sometimes given to the great galangal. See KEMPFERIA.

ACORUS, in *Natural History*, blue coral. The true sort is very scarce; some, however, is fished on the coasts of Africa, particularly from Rio del Re to the river of the Camarones. This coral is part of the merchandise which the Dutch trade for with the Camarones: that of the kingdom of Benin is also very much esteemed. It grows in form of a tree on a rocky bottom.

ACOSTA, URIEL, a Portuguese, born at Oporto

towards the close of the 16th century. He was educated in the Romish religion, which his father also professed, though descended from one of those Jewish families who had been in a manner forced to receive baptism. Uriel had a liberal education. He was instructed in several sciences; and at last he studied law. He had by nature a good temper and mild disposition; and religion had made so deep an impression on his mind, that he ardently desired to conform to all the precepts of the church, to avoid eternal death, which he dreaded. He applied with great assiduity to reading the Scriptures and other religious books, carefully consulting also the creed of the confessors; but the more he studied, the more difficulties occurred, which perplexed him at length to such a degree, that, being unable to solve them, he fell into the most terrible agonies of mind. He thought it impossible to fulfil his duty with regard to the conditions required for absolution; so that he despaired of salvation, if he could find no other means of attaining it; and it proved difficult to abandon a religion in which he had been bred up from his infancy, and which had been deeply rooted in his mind. However he began to inquire, whether several particulars mentioned about the other life were agreeable to reason; and, upon inquiry and deliberation, he imagined that reason suggested many arguments against them. Acofta was about two and twenty, when he was thus perplexed with doubts; and the result of his reflections was, that he could not be saved by the religion which he had imbibed in his infancy. Nevertheless he prosecuted his studies in the law; and at the age of five and twenty, was made treasurer in a collegiate church. Being naturally of a religious disposition, and now made uneasy by the popish doctrines, he began to study Moses and the prophets; where he thought he found more satisfaction than in the gospel, and at length became convinced that Judaism was the true religion: and, as he could not profess it in Portugal, he resolved to leave the country. He accordingly resigned his place, and embarked for Amsterdam with his mother and brothers; whom he had ventured to instruct in the principles of the Jewish religion, even when in Portugal. Soon after their arrival in Amsterdam, they became members of the synagogue; were circumcised according to custom; and he changed his name of Gabriel for that of Uriel. A little time was sufficient to shew him, that the Jews did neither in their rites nor morals conform to the law of Moses, of which he could not but declare his disapprobation: but the chiefs of the synagogue gave him to understand, that he must exactly observe their tenets and customs; and that he would be excommunicated, if he deviated in the least from them. This threat, however, had no effect; for he thought it would be a most mean behaviour in him, who had left the sweets of his native country purely for liberty of conscience, to submit to a set of Rabbis without any proper jurisdiction; and that it would shew both want of courage and piety, if he should stifle his sentiments on this occasion. He therefore persisted in his invectives, and in consequence was excommunicated: the effect of which was such, that his own brothers durst not speak to him, nor salute him when they met him in the streets. Finding himself thus situated, he wrote a book in his justification; wherein he endeavours to shew, that the rites and traditions

Acoſta,
Acouſtics.

ditions of the Pharifees are contrary to the writings of Moſes, and ſoon after adopted the opinion of the Sadducees : for he had worked himſelf up to a belief, that the rewards and puniſhments of the old law relate only to this life; and this, becauſe Moſes nowhere mentions the joys of heaven, or the torments of hell. His adverſaries were overjoyed at his embracing this tenet; foreſeeing, that it would tend greatly to juſtify, in the ſight of Chriſtians, the proceedings of the ſynagogues againſt him. Before his book was printed, there appeared a piece upon the immortality of the ſoul, written by a phyſician, who omitted nothing he could ſuggeſt to make Acoſta paſs for an Atheiſt. The very children were encouraged to inſult him in the ſtreets, and to batter his houſe with ſtones; all which however did not prevent him from writing a treatiſe againſt the phyſician, wherein he endeavoured to confute the doctrine of the ſoul's immortality. The Jews now made application to the magiſtrates of Amſterdam; and informed againſt him, as one who wanted to undermine the foundation of both Jewiſh and Chriſtian religions. He was thrown into priſon, but bailed out within a week or ten days after; however all the copies of his works were ſeized, and he himſelf fined in 300 florins. Nevertheleſs, he proceeded ſtill farther in his ſcepticiſm. He now began to examine, whether the laws of Moſes came from God; and he ſuppoſed he had at length found reaſons to convince him, that it was only a political invention. Yet, inſtead of drawing this inference from thence, "I ought not to return to the Jewiſh communion," he thus argued with himſelf, Why ſhould I continue all my life cut off from the communion, expoſed to ſo many inconveniences, eſpecially as I am in a country where I am a ſtranger, and unacquainted with the language? Had I not better play the ape amongſt apes?" He accordingly returned to the Jewiſh church, after he had been excommunicated 15 years; and, after having made a recantation of what he had written, ſubſcribed every thing as they directed. A few days after, he was accuſed by a nephew, who lived in his houſe, that he did not, as to his eating and many other points, conform to the laws of the ſynagogue. This accuſation was attended with very bad conſequences; for a relation of Acoſta, who had got him reconciled to the ſynagogue, thought he was in honour bound to perſecute him with the utmoſt violence. The Rabbis and the reſt of the Jews were animated with the ſame ſpirit; eſpecially, when they found that Acoſta had diſſuaded two Chriſtians,

who had come from London to Amſterdam, from turning Jews. He was ſummoned before the grand council of the ſynagogue; when it was declared to him, that he muſt again be excommunicated, if he did not give ſuch ſatisfaction as ſhould be required. He found the terms ſo hard, that he could not comply. The Jews thereupon again expelled him from their communion; and he afterwards ſuffered various hardſhips and great perſecutions, even from his own relations. After remaining ſeven years in a moſt wretched ſituation, he at length declared he was willing to ſubmit to the ſentence of the ſynagogue, having been told that he might eaſily accommodate matters; for, that the judges, being ſatiſfied with his ſubmiſſion, would ſoften the ſeverity of the diſcipline. Acoſta, however, was caught in a ſnare; for they made him undergo the moſt rigorous penance. Theſe particulars, relating to the life of Acoſta, are taken from his work, entitled, "*Exemplar humanæ Vitæ*," publiſhed and reſuted by Limborch. It is ſuppoſed that he compoſed it a few days before his death, after having determined to lay violent hands on himſelf. He executed this horrid reſolution, a little after he had failed in his attempt to kill his principal enemy; for the piſtol, with which he intended to have ſhot him as he paſſed his houſe, having miſſed fire, he immediately ſhut the door, and ſhot himſelf with another piſtol. This happened at Amſterdam, but in what year is not exactly known.

Acoſta
Acouſtics.

ACOSTAN, a mountainous iſland in the north ſea between Aſia and America, obſerved by Captain Coçk.

ACOUSMATICI, ſometimes alſo called *Acouſtici*, in *Grecian Antiquity*, ſuch of the diſciples of Pythagoras as had not completed their five years probation.

ACOUSTIC, in general, denotes any thing that relates to the ear, the ſenſe of hearing, or the doctrine of ſounds.

Acouſtic Duſt, in *Anatomy*, the ſame with *meatus auditorius*, or the external paſſage of the ear. See ANATOMY.

Acouſtic Inſtrument, or auricular tube. See ACOUSTICS.

Acouſtic Veſſels, in the ancient theatres, were a kind of veſſels, made of braſs, ſhaped in the bell ſhion, which being of all tones within the pitch of the voice or even of inſtruments, rendered the ſounds more audible, ſo that the actors could be heard through all parts of theatres which were even 400 feet in diameter.

Acouſtic Diſciples, among the ancient Pythagoreans, thoſe more commonly called ACOUSMATICI.

A C O U S T I C S,

Preliminary
Observations.

IN *Physics*, is that ſcience which inſtructs us in the nature of ſound. It is divided by ſome writers into *Diacouſtics*, which explains the properties of thoſe ſounds that come directly from the ſonorous body to the ear; and *Catacouſtics*, which treats of reflected ſounds: but ſuch diſtinctions do not appear to be of any real utility.

Sound is a term of which it would be prepoſterous to offer any definition, as it may almoſt be ſaid to expreſs a ſimple idea: But when we conſider it as a SENSATION, and ſtill more when we conſider it as a PER-

CEPTION, it may not be improper to give a deſcription of it; becauſe this muſt involve certain relations of external things, and certain trains of events in the material world, which make it a proper object of philoſophical diſcuſſion. Sound is that primary information which we get of external things by means of the ſenſe of hearing. This, however, does not explain it: for were we in like manner to deſcribe our ſenſe of hearing, we ſhould find ourſelves obliged to ſay, that it is the faculty by which we perceive ſound. Languages are not the invention of philoſophers; and we muſt not expect

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expect precision, even in the simplest cases. Our methods of expressing the information given us by our different senses are not similar, as a philosopher, cautiously contriving language, would make them. We have no word to express the primary or generic object of our sense of seeing; for we believe, that even the vulgar consider light as the medium, but not the object. This is certainly the case (how justly we do not say) with the philosopher. On the other hand, the words smell, sound, and perhaps taste, are conceived by most persons as expressing the immediate objects of the senses of smelling, hearing, and tasting. Smell and sound are hastily conceived as separate existences, and as mediums of information and of intercourse with the odoriferous and sounding bodies; and it is only the very cautious philosopher who distinguishes between the smell which he feels and the perfume which fills the room. Those of the ancients, therefore, who taught that sounds were beings wafted through the air, and felt by our ears, should not, even at this day, be considered as awkward observers of nature. It has required the long, patient, and sagacious consideration of the most penetrating geniuses, from Zeno the Stoic to Sir Isaac Newton, to discover that what we call sound, the *immediate* external object of the sense of hearing, is nothing but a particular agitation of the parts of surrounding bodies, acting by mechanical impulse on our organs; and that it is not any separate being, nor even a specific quality inherent in any particular thing, by which it can affect the organ, as we suppose with respect to a perfume, but merely a mode of existence competent to every atom of matter. And thus the description which we proposed to give of sound must be a description of that state of external contiguous matter which is the *cause* of sound. It is not therefore prefatory to any theory or set of doctrines on this subject; but, on the contrary, is the sum or result of them all.

To discover this state of external body by which, without any farther intermedium of substance or of operation, it affects our sensitive faculties, must be considered as a great step in science. It will show us at least one way by which mind and body may be connected. It is supposed that we have attained this knowledge with respect to sound. Our success, therefore, is a very pleasing gratification to the philosophic mind. It is still more important in another view: it has encouraged us to make similar attempts in other cases, and has supplied us with a fact to which an ingenious mind can easily fancy something analogous in many abstruse operations of nature, and thus it enables us to give some sort of explanation of them. Accordingly this use has been most liberally made of the mechanical theory of sound; and there is now scarcely any phenomenon, either of matter or mind, that has not been explained in a manner somewhat similar. But we are sorry to say that these explanations have done no credit to philosophy. They are, for the most part, strongly marked with that precipitate and self-conceited impatience which has always characterized the investigations conducted solely by ingenious fancy. The consequences of this procedure have been no less fatal to the progress of true knowledge in modern times than in the schools of ancient Greece; and the ethereal philosophers of this age, like the followers of Aristotle of old, have filled ponderous volumes with nonsense

and error. It is strange, however, that this should be the effect of a great and a successful step in philosophy: But the fault is in the philosophers, not in the science. Nothing can be more certain than the account which Newton has given of the propagation of a certain class of undulations in an elastic fluid. But this procedure of nature cannot be seen with distinctness and precision by any but well-informed mathematicians. They alone can rest with unshaken confidence on the conclusions legitimately deduced from the Newtonian theorems; and even they can insure success only by treading with the most scrupulous caution the steps of this patient philosopher. But few have done this; and we may venture to say, that not one in ten of those who employ the Newtonian doctrines of elastic undulations for the explanation of other phenomena have taken the trouble, or indeed were able, to go through the steps of the fundamental proposition (Prin. II. 50, &c.) But the *general* results are so plain, and admit of such impressive illustration, that they draw the assent of the most careless reader; and all imagine that they understand the explanation, and perceive the whole procedure of nature. Emboldened therefore by this successful step in philosophy, they, without hesitation, *fancy* similar intermediums in other cases; and as air has been found to be a vehicle for sound, they have supposed that something which they call ether, somehow resembling air, is the vehicle of vision. Others have proceeded farther, and have held that ether, or another something like air, is the vehicle of sensation in general, from the organ to the brain: nay, we have got a great volume called A THEORY OF MAN, where all our sensations, emotions, affections, thoughts, and purposes or volitions, are said to be so many vibrations of another something equally unseen, gratuitous, and incompetent; and, to crown all, this exalted doctrine, when logically prosecuted, must terminate in the discovery of those vibrations which pervade all others, and which constitute what we have been accustomed to venerate by the name DEITY. Such *must* be the termination of this philosophy; and a truly philosophical dissertation on the attributes of the Divine Being *can be nothing else* than an accurate description of these vibrations!

This is not a needless and declamatory rhapsody. If the explanation of sound can be legitimately transferred to those other classes of phenomena, these are certain results; and if so, all the discoveries made by Newton are but the glimmerings of the morning, when compared with this meridian splendour. But if, on the other hand, sound logic forbids us to make this transference of explanation, we must continue to believe, for a little while longer, that mind is something different from vibrating matter, and that no kind of oscillations will constitute infinite wisdom.

It is of immense importance therefore to understand thoroughly this doctrine of sound, that we may see clearly and precisely in what it consists, what are the phenomena of sound that are fully explained, what are the data and the assumptions on which the explanations proceed, and what is the *precise mechanical fact* in which it terminates. For this, or a fact perfectly similar, must terminate every explanation which we derive from this by analogy, however perfect the analogy may be. This *previous* knowledge must be completely pos-

sessed.

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feffed by every person who pretends to explain other phenomena in a fimilar manner. Then, and not till then, he is able to fay what claffes of phenomena will admit of the explanation: and, when all this is done, his explanation is ftill an *hypothefts*, till he is able to prove, from other indifputable fources, the exiftence and agency of the fame thing analogous to the elastic fluid, from which all is borrowed.

At prefent therefore we fhall content ourfelves with giving a fhort hiftory of the fpeculations of philofophers on the nature of found, tracing out the fteps by which we have arrived at the knowledge which we have of it. We apprehend this to be of great importance; becaufe it fhows us what kind of evidence we have for its truth, and the paths which we muft fhun if we wifh to proceed farther: and we truft that the progrefs which we have made will appear to be fo real, and the object to be attained fo alluring to a truly philofophical mind, that men of genius will be incited to exert their utmoft efforts to pafs the prefent boundaries of our real progrefs.

First notions of found.

In the infancy of philofophy, found was held to be a feparate exiftence, fomething which would be, although no hearing animal exifted. This was conceived as wafted through the air to our organ of hearing, which it was fuppofed to affect in a manner refembling that in which our noftrils are affected when they give us the fenfation of fmell. It was one of the Platonic SPECIES, fitted for exciting the intellectual fpecies, which is the immediate object of the foul's contemplation.

Yet, even in thofe early years of fciences, there were fome, and, in particular, the celebrated founder of the Stoic fchool, who held that found, that is, the caufe of found, was only the particular motion of external grofs matter, propagated to the ear, and there producing that agitation of the organ by which the foul is immediately affected with the fenfation of found. Zeno, as quoted by Diogenes Laertius*, fays, "Hearing is produced by the air which intervenes between the thing founding and the ear. The air is agitated in a fpherical form, and moves off in waves, and falls on the ear, in the fame manner as the water in a ciftern undulates in circles when a ftone has been thrown into it." The ancients were not remarkable for precision, either of conception or argument in their difcuffions, and they were contented with a general and vague view of things. Some followed the Platonic notions, and many the opinion of Zeno, but without any farther attempts to give a diftinct conception of the explanation, or to compare it with experiment.

* B. vii.
§ 158.
Zeno's opinion.

But in later times, during the ardent recherches in the laft century into the phenomena of nature, this became an interefting fubject of inquiry. The invention of the air-pump gave the firft opportunity of deciding by experiment whether the elastic undulations of air were the caufes of found: and the trial fully eftablifhed this point; for a bell rung *in vacuo* gave no found, and one rung in condensed air gave a very loud one. It was therefore received as a doctrine in general phyfics that air was the vehicle of found.

Air the vehicle of found proved by the air-pump.

Galileo's difcovery of the nature of mufical chords.

The celebrated Galileo, the parent of mathematical philofophy, difcovered the nature of that connection between the lengths of mufical chords and the notes which they produced, which had been obferved by Pythago-

ras, or learned by him in his travels in the eaft, and which he made the foundation of a refined and beautiful fciences, the theory of mufic. Galileo fhewed, that the real connection fubfifted between the tones and the vibrations of thefe cords, and that their different degrees of acutenefs correfponded to the different frequency of their vibrations. The very elementary and familiar demonftration which he gave of this connection did not fatisfy the curious mathematicians of that inquisitive age; and the mechanical theory of mufical cords was profecuted to a great degree of refinement. In the courfe of this investigation, it appeared that the chord vibrated in a manner precifely fimilar to a pendulum vibrating in a cycloid. It muft therefore agitate the air contiguous to it in the fame manner; and thus there is a particular kind of agitation which the air *can* receive and maintain, which is very interefting.

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Sir Ifaac Newton took up this queftion as worthy of his notice; and endeavoured to afcertain with mathematical precision the mechanism of this particular clafs of undulations, and gave us the fundamental theorems concerning the undulations of elastic fluids, which make the 47, &c. propofitions of Book II. of his Principles of Natural Philofophy. They have been (perhaps haftily) confidered as giving the fundamental doctrines concerning the propagation of found. A variety of facts are narrated in the article PNEUMATICS, to fhew that fuch undulations *actually obtain* in the air of our atmofphere, and are accompanied by a fet of phenomena of found which precifely correfpond to all the mechanical circumftances of thefe undulations.

correfponds with the phenomena of found.

In the mean time, the anatomifts and phyfiogifts were bufily employed in examining the ftructure of our organs of hearing. Impreffed with the validity of this doctrine of aerial undulations being the caufes of found, their recherches were always directed with a view to difcover thofe circumftances in the ftructure of the ear which rendered it an organ fufceptible of agitations from this caufe; and they difcovered many which appeared as contrivances for making it a drum, on which the aerial undulations from without muft make very forcible impulfes, fo as to produce very fonorous undulations in the air contained in it. Thefe therefore they confidered as the *immediate* objects of fenfation, or the immediate caufes of found.

Researches of anatomifts.

But fome anatomifts faw that this would not be a full account of the matter: for after a drum is agitated, it has done all that it can do; it has produced a noife. But a farther procefs goes on in our ear: There is behind the membrane, which is the head of this drum, a curious mechanism, which communicates the agitations of the membrane (the only thing acted on by the undulating air) to another chamber of moft fingular conftruction, where the auditory nerve is greatly expanded. They conceive, therefore, that the organ called the *drum* does not act as a drum, but in fome other way. Indeed it feems bad logic to fuppofe that it acts as a drum merely by producing a noife. This is in no refpect different from the noife, produced out of the ear; and if it is to be heard as a noife, we muft have another ear by which it may be heard, and this ear muft be another *fuch* drum; and this muft have another, and fo on for ever. It is like the inaccurate notion that *vision* is the contemplation of the picture on the retina. Thefe anatomifts attended therefore to the ftructure. Here they obferved

Structure of the ear.

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observed a prodigious unfolding of the auditory nerve of the ear, which is curiously distributed through every part of this cavity, lining its sides, hung across it like a curtain, and sending off fibres in every direction, so as to leave hardly a point of it unoccupied. They thought the machinery contained in the drum peculiarly fitted for producing undulations of the air contained in this labyrinth, and that by these agitations of the air the contiguous fibres of the auditory nerve are impelled, and that thus we get the sensation of sound.

Of the hu-
man.

The cavity intervening between the external ear and this inner chamber appeared to these anatomists to have no other use than to allow a very free motion to the *stapes* or little piston that is employed to agitate the air in the labyrinth. This piston condenses on a very small surface the impulse which it receives from a much larger surface, strained by the malleus on the entry of the tympanum, on purpose to receive the gentle agitations of the external air in the outer canal. This membranous surface could not be agitated, unless completely detached from every thing round it; therefore all animals which have this mechanism have it in a cavity containing only air. But they held, that nature had even taken precautions to prevent this cavity from acting as a drum, by making it of such an irregular rambling form; for it is by no means a cavity of a symmetrical shape, like a vessel, but rather resembles the rambling holes and blebs which are often seen in a piece of bread, scattered through the substance of the cranium, and communicating with each other by small passages. The whole of these cavernulæ are lined with a softish membrane, which still farther unfits this cavity for producing sound. This reasoning is specious, but not very conclusive. We might even assert, that this anfractuous form, with narrow passages, is well fitted for producing noise. If we place the ear close to the small hole in the side of a military drum, we shall hear the smallest tap of the drumstick like a violent blow. The lining of the cavernulæ is nervous, and may therefore be strongly affected in the numerous narrow passages between the cells.

Of other
animals.

While these speculations were going on with respect to the ear of the breathing animals, observations were occasionally made on other animals, such as reptiles, serpents, and fishes, which give undoubted indications of hearing; and many very familiar facts were observed or recollected, where sounds are communicated through or by means of solid bodies, or by water: therefore, without inquiring how or by what kind of mechanism it is brought about, it became a very general belief among physiologists, that all fishes, and perhaps all animals hear, and that water in particular is a vehicle of sound. Many experiments are mentioned by Kircher and others on the communication of sound through solid bodies, such as masts, yards, and other long beams of dry fir, with similar results. Dr Monro has published a particular account of very curious experiments on the propagation of sound through water in his Dissertation on the Physiology of Fishes; so that it now appears that air is by no means the only vehicle of sound.

Water dis-
covered in
the inter-
nal ear.

In 1760 Cotunni published his important discovery, that the labyrinth or inmost cavity of the ear in animals is completely filled with water. This, after some contest, has been completely demonstrated (see in

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particular Meckel Junior *de Labyrinthi Auris Contentionis*, Argentor. 1777), and it seems now to be admitted by all.

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This being the case, our notions of the immediate cause of sound must undergo a great revolution, and a new research must be made into the way in which the nerve is affected: for it is not enough that we substitute the undulations of water for those of air in the labyrinth. The well informed mechanician will see at once, that the vivacity of the agitations of the nerve will be greatly increased by this substitution; for if water be perfectly elastic through the whole extent of the undulatory agitation which it receives, its effect will be greater in proportion to its specific gravity: and this is confirmed by an experiment very easily made. Immerse a table-bell in water contained in a large thin glass vessel. Strike it with a hammer. The sound will be heard as if the bell had been immediately struck on the sides of the vessel. The filling of the labyrinth of the ear with water is therefore an additional mark of the wisdom of the Great Artist. But this is not enough for informing us concerning the ultimate mechanical event in the process of hearing. The manner in which the nerve is exposed to these undulations must be totally different from what was formerly imagined. The filaments and membranes, which have been described by former anatomists, must have been found by them in a state quite unlike to their situation and condition in the living animal. Accordingly the most eminent anatomists of Europe seem at present in great uncertainty as to the state of the nerve, and are keenly occupied in observations to this purpose. The descriptions given by Monro, Scarpa, Camper, Comparetti, and others, are full of most curious discoveries, which make almost a total change in our notions of this subject, and will, we hope, be productive of most valuable information.

Increases
the force of
the undula-
tions.

Scarpa has discovered that the solid cavity called the *labyrinth* contains a threefold expansion of the auditory nerve. One part of it, the cochlea, contains it in a fibrous state, ramified in a most symmetrical manner through the whole of the *zona mollis* of the *lamina spiralis*, where it anastomoses with another production of it diffused over the general lining of that cavity. Another department of the nerve, also in a fibrous state, is spread over the external surface of a membranaceous bag, which nearly fills that part of the vestibule into which the semicircular canals open, and also that orifice which receives the impressions of the *stapes*. This bag sends off tubular membranaceous ducts, which, in like manner, nearly fill these semicircular canals. A third department of the nerve is spread over the external surface of another membranaceous bag, which lies between the one just now mentioned and the cochlea, but having no communication with either, almost completely filling the remainder of the vestibule. Thus the vestibule and canals seem only a case for protecting this sensitive membranaceous vessel, which is almost, but not altogether, in contact with the osseous case, being separated by a delicate and almost fluid cellular substance. The fibrillous expansion of the nerve is not indiscriminately diffused over the surface of these sacculi, but evidently directed to certain foci, where the fibres are constricted. And this is the last appearance of the fibrous state of the nerve; for when the inside of these sacculi is inspected, no fibres appear, but a pulp (judged to be nervous

from

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Comparati-
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Descrip-
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from its similarity to other pulpy productions of the brain) adhering to the membranaceous coat, and not separable from it by gently washing it. It is more abundant, that is, of greater thickness, opposite to the external fibrous foci. No organical structure could be discovered in this pulp, but it probably is organized; for, besides this adhering pulp, the water in the sacculi was observed to be clammy or mucous; so that in all probability the vascular or fibrous state of the nerve is succeeded by an uninterrupted production (perhaps columnar like basalt, though not cohering); and this at last ends in simple dissemination, symmetrical however, where water and nerve are alternate in every direction.

To these observations of Scarpa, Comparetti adds the curious circumstances of another and regular tympanum in the foramen rotundum, the cylindrical cavity of which is enclosed at both ends by a fine membrane. The membrane which separates it from the cochlea appears to be in a state of variable tension, being drawn up to an umbo by a cartilaginous speck in its middle, which he thinks adheres to the lamina spiralis, and thus serves to strain the drumhead, as the malleus strains the great membrane known to all.

These are most important observations, and must greatly excite the curiosity of a truly philosophical mind, and deserve the most careful inquiry into their justness. If these are accurate descriptions of the organ, they seem to conduct us farther into the secrets of nature than any thing yet known.

We think that they promise to give us the greatest step yet made in physiology, viz. to show us the last mechanical fact which occurs in the long train interposed between the external body and the incitement of our sensitive system. But there is, as yet, great and essential differences in the descriptions given by those celebrated naturalists. It cannot be otherwise. The containing labyrinth can be laid open to our view in no other way than by destroying it; and its most delicate contents are the first sufferers in the search. They are found in very different situations and conditions by different anatomists, according to their address or their good fortune. Add to this, that the natural varieties are very considerable. Faithful descriptions must therefore give very different notions of the ultimate action and reaction between the unorganized matter in the labyrinth and the ultimate expansion of the auditory nerve.

The progress which has been made in many parts of natural science has been great and wonderful; and perhaps we are not too sanguine, when we express our hopes that the observations and experiments of anatomists and mechanics will soon furnish us with such a collection of facts respecting the structure and the contents of the organ of hearing, as might enable us to give a juster theory of sound than is yet to be found in the writings of philosophers. There seems to be no abatement of ardour in the researches of the physiologists; and they will not remain long ignorant of the truth or mistake in the accounts given by Scarpa and Comparetti. A collection of accurate observations on the structure of the ear would give us principles on which to proceed in explaining the various methods of producing external sounds. The nature of *continued sounds* might then be treated of, and would appear, we believe, very different from

what it is commonly supposed. Under this head Preliminary animal voices might be particularly considered, and the elements of human speech properly ascertained. Observations. When the production of continued sounds is once shown to be a thing regulated by principle, it may be systematically treated, and this principle may be considered as combined with every mechanical state of body that may be pointed out. This will suggest to us methods of producing sound which have not yet been thought of, and may therefore give us sounds with which we are unacquainted. Such an acquisition is not to be despised nor rejected. The bountiful Author of our being and of all our faculties has made it an object of most enchanting relish to the human mind. The Greeks, the most cultivated people who have ever figured on the stage of life, enjoyed the pleasures of music with rapture. Even the poor negro, after toiling a whole day beneath a tropical sun, will go ten miles in the dark to dance all night to the simple music of the balafoe, and return without sleep to his next day's toil. The penetrating eye of the anatomist has discovered in the human larynx an apparatus evidently contrived for tempering the great movements of the glottis, so as to enable us to produce the intended note with the utmost precision. There is no doubt therefore that the consummate Artist has not thought it unworthy of his attention. We ought therefore to receive with thankfulness this present from our Maker—this *laborum dulce lenimen*; and it is surely worthy the attention of the philosopher to add to this innocent elegance of life.

CHAP. I. *Different Theories of Sound.*

Most sounds, we all know, are conveyed to us on the bosom of the air. In whatever manner they either float upon it, or are propelled forward in it, certain it is, that, without the vehicle of this or some other fluid, we should have no sounds at all. Let the air be exhausted from a receiver, and a bell shall emit no sound when rung in the void; for, as the air continues to grow less dense, the sound dies away in proportion, so that at last its strongest vibrations are almost totally silent.

Thus air is a vehicle for sound. However, we must not, with some philosophers, assert, that it is the only vehicle; that, if there were no air, we should have no sounds whatsoever: for it is found by experiment, that sounds are conveyed through water with the same facility with which they move through air. A bell rung in water returns a tone as distinct as if rung in air. This was observed by Derham, who also remarked that the tone came a quarter deeper. It appears from the experiments of naturalists, that fishes have a strong perception of sounds, even at the bottom of deep rivers. From hence, it would seem not to be very material in the propagation of sounds, whether the fluid which conveys them be elastic or otherwise. Water, which, of all substances that we know, has the least elasticity, yet serves to carry them forward; and if we make allowance for the difference of its density, perhaps the sounds move in it with a proportional rapidity to what they are found to do in the elastic fluid of air. But though air and water are both vehicles of sound, yet neither of them according to some philosophers seems to

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to be so by itself, but only as it contains an exceedingly subtle fluid capable of penetrating the most solid bodies. Hence, by the medium of that fluid, sounds can be propagated through wood, or metals, even more readily than through the open air. By the same means, deaf people may be made sensible of sounds if they hold a piece of metal in the mouth, one end of which is applied to the sounding body. And as it is certain, that air cannot penetrate metals, the medium of sound, say they, must be of a more subtle nature; and thus the electrical fluid will naturally occur as the proper one. But why then is sound no longer heard in an exhausted receiver, if the air is not the fluid by which it is conveyed, seeing the electrical matter cannot be excluded? The reply to this is obvious: The electrical fluid is so exceedingly subtle, and pervades solid bodies with so much ease, that any motion of a solid body in a quantity of electric matter by itself, can never excite a degree of agitation in it sufficient for producing a sound; but if the electric fluid is entangled among the particles of air, water, wood, metal, &c. whatever affects their particles will also affect this fluid, and produce an audible noise. In the experiment of the air pump, it is alleged there may be an ambiguity, as the gradual exhausting of the air creates an increasing difference of pressure on the outside, and may occasion in the glass a difficulty of vibrating, so as to render it less fit to communicate to the air without the vibrations that strike it from within. From this cause the diminution of sound in an exhausted receiver may be supposed to proceed, as well as from the diminution of the air. But if any internal agitation of its parts should happen to the electrical fluid, exceeding loud noises might be propagated through it, as has been the case when large meteors have kindled at a great distance from the earth. It is also difficult, they suppose, to account for the amazing velocity of sound, upon the supposition that it is propagated by means of air alone; for nothing is more certain, than that the strongest and most violent gale is, in its course, inert and sluggish, compared with the motion of sound.

What sound
is, and how
propagated.

One thing however is certain, that whether the fluid which conveys the note be elastic, or nonelastic, whatever sound we hear is produced by a stroke, which the sounding body makes against the fluid, whether air or water. The fluid being struck upon, carries the impression forward to the ear, and there produces its sensation. Philosophers are so far agreed, that they all allow that sound is nothing more than the impression made by an elastic body upon the air or water, and this impression carried along by either fluid to the organ of hearing. But the manner in which this conveyance is made, is still disputed: Whether the sound is diffused into the air, in circle beyond circle, like the waves of water when we disturb the smoothness of its surface by dropping in a stone; or whether it travels along, like rays diffused from a centre, somewhat in the swift manner that electricity runs along a rod of iron; these are the questions which have divided the learned.

Newton's
theory,

Newton was of the first opinion. He has explained the progression of sound by an undulatory, or rather a vermicular, motion in the parts of the air. If we have an exact idea of the crawling of some insects, we shall have a tolerable notion of the progression of sound upon

this hypothesis. The insect, for instance, in its motion, first carries its contractions from the hinder part, in order to throw its fore part to the proper distance, then it carries its contractions from the fore part to the hinder to bring that forward. Something similar to this is the motion of the air when struck upon by a sounding body. To be a little more precise, suppose ABC, Plate I. fig. 1. the string of a harpsichord screwed to a proper pitch, and drawn out of the right line by the finger at B. We shall have occasion elsewhere to observe, that such a string would, if let go, vibrate to E; and from E to D, and back again; that it would continue thus to vibrate like a pendulum, for ever, if not externally resisted, and like a pendulum, all its little vibrations would be performed in equal times, the last and the first being equally long in performing; also that, like a pendulum, its greatest swiftness would always be when it arrived at E, the middle part of its motion. Now then, if this string be supposed to fly from the finger at B, it is obvious, that whatever be its own motion, such also will be the motion of the parts of air that fly before it. Its motion, as is obvious, is first uniformly accelerated forward from B to E, then retarded as it goes from E to D, accelerated back again as it returns from D to E, and retarded from E to B. This motion being therefore successively produced through a range of elastic air, it must happen, that the parts of one range of air will be sent forward with accelerated motion, and then with a retarded motion. This accelerated motion reaching the remotest end of the first range will be communicated to a second range, while the nearest parts of the first range being retarded in their motion, and falling back with the recession of the string, retire first with an accelerated, then with a retarded motion, and the remotest parts will soon follow. In the mean time, while the parts of the first range are thus falling back, the parts of the second range are going forward with an accelerated motion. Thus there will be an alternate condensation and relaxation of the air, during the time of one vibration; and as the air going forward strikes any opposing body with greater force than upon retiring, so each of these accelerated progressions have been called by Newton a *pulse* of sound.

Thus will the air be driven forward in the direction of the string. But now we must observe, that these pulses will move every way; for all motion impressed upon fluids in any direction whatsoever, operates all around in a sphere: so that sounds will be driven in all directions, backwards, forwards, upwards, downwards, and on every side. They will go on succeeding each other, one on the outside of the other, like circles in disturbed water; or rather, they will lie one without the other, in concentric shells, shell above shell, as we see in the coats of an onion.

All who have remarked the tone of a bell, while its sounds are decaying away, must have an idea of the pulses of sound, which according to Newton, are formed by the air's alternate progression and recession. And it must be observed, that as each of these pulses is formed by a single vibration of the string, they must be equal to each other; for the vibrations of the string are known to be so.

Again, As to the velocity with which sounds travel, this Newton determines, by the most difficult calculation

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tion that can be imagined, to be in proportion to the thickness of the parts of the air, and the distance of these parts from each other. From hence he goes on to prove, that each little part moves backward and forward like a pendulum; and from thence he proceeds to demonstrate, that if the atmosphere were of the same density everywhere as at the surface of the earth, in such a case, a pendulum, that reached from its highest surface down to the surface of the earth, would by its vibrations discover to us the proportion of the velocity with which sounds travel. The velocity with which each pulse would move, he shows, would be as much greater than the velocity of such a pendulum swinging with one complete vibration, as the circumference of a circle is greater than the diameter. From hence he calculates, that the motion of sound will be 979 feet in one second. But this not being consonant to experience, he takes in another consideration, which destroys entirely the rigour of his former demonstration, namely, vapours in the air; and then finds the motion of sound to be 1142 feet in one second, or near 13 miles in a minute; a proportion which experience had established nearly before.

Preceding
theory op-
posed.

Thus much will serve to give an obscure idea of a theory which has met with numerous opposers. Even John Bernouilli, Newton's greatest disciple, modestly owns that he did not pretend to understand this part of the *Principia*. He attempted therefore to give a more perspicuous demonstration of his own, that might confirm and illustrate the Newtonian theory. The subject seemed to reject elucidation; his theory is obviously wrong, as D'Alembert has proved in his *Theory of Fluids*.

The objec-
tions.

Various have been the objections that have been made to the Newtonian system of sounds. It is urged, that this theory can only agree with the motion of sound in an elastic fluid, whereas sounds are known to move forward through water that is not elastic. To explain their progress therefore through water, a second theory must be formed: so that two theories must be made to explain a similar effect; which is contrary to the simplicity of true philosophy, for it is contrary to the simplicity of nature. It is further urged, that this slow vermicular motion but ill represents the velocity with which sounds travel, as we know by experience that it is almost 13 miles in a minute. In short, it is urged, that such undulations as have been described, when coming from several sonorous bodies at once, would cross, obstruct, and confound each other; so that, if they were conveyed to the ear by this means we should hear nothing but a medley of discord and broken articulations. But this is equally with the rest contradictory to experience, since we hear the fullest concert, not only without confusion, but with the highest pleasure. These objections, whether well founded or not, have given rise to another theory: which we shall likewise lay before the reader; though it too appears liable to objections, which shall be afterwards mentioned.

Another
theory.

Every sound may be considered as driven off from the sounding body in straight lines, and impressed upon the air in one direction only: but whatever impression is made upon a fluid in one direction, is diffused upon its surface into all directions: so that the sound first driven directly forward soon fills up a wide sphere, and

is heard on every side. Thus, as it is impressed, it instantaneously travels forward with a very swift motion, resembling the velocity with which we know electricity flies from one end of a line to another.

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Now, as to the pulses, or close shakes as the musicians express it, which a sounding body is known to make, each pulse (say the supporters of this theory) is itself a distinct and perfect sound, and the interval between every two pulses is profoundly silent. Continuity of sound from the same body is only a deception of the hearing; for as each distinct sound succeeds at very small intervals, the organ has no time to transmit its images with equal swiftness to the mind, and the interval is thus lost to sense: just as in seeing a flaming torch, whirled rapidly round, it appears as a ring of fire. In this manner a beaten drum, at some small distance, presents us with the idea of continuing sound. When children run with their sticks along a rail, a continuing sound is thus represented, though it need scarce be observed that the stroke against each rail is perfectly distinct and insulated.

According to this theory, therefore, the pulses are nothing more than distinct sounds repeated by the same body, the first stroke or vibration being ever the loudest, and travelling farther than those that follow; while each succeeding vibration gives a new sound, but with diminished force, till at last the pulses decay away totally, as the force decays that gives them existence.

All bodies whatsoever that are struck return more or less a sound: but some, wanting elasticity, give back no repetition of the sound; the noise is at once produced and dies: while other bodies, however, there are, which being more elastic and capable of vibration, give back a sound, and repeat the same several times successively. These last are said to have a tone; the others are not allowed to have any.

This tone of the elastic string, or bell, is notwithstanding nothing more than a similar sound of what the former bodies produced, but with the difference of being many times repeated, while their note is but single. So that, if we would give the former bodies a tone, it will be necessary to make them repeat their sound, by repeating our blows swiftly upon them. This will effectually give them a tone; and even an unmusical instrument has often had a fine effect by its tone in our concerts.

Let us now go on then to suppose, that by swift and equally continued strokes we give any nonelastic body its tone: it is very obvious, that no alterations will be made in this tone by the quickness of the strokes, though repeated ever so fast. These will only render the tone more equal and continuous, but make no alteration in the tone it gives. On the contrary, if we make an alteration in the force of each blow, a different tone will then undoubtedly be excited. The difference will be small, it must be confessed; for the tones of these inflexible bodies are capable but of small variation; however, there will certainly be a difference. The table on which we write, for instance, will return a different sound when struck with a club, from what it did when struck only with a switch. Thus nonelastic bodies return a difference of tone, not in proportion to the swiftness with which their sound is repeated, but in proportion to the greatness of the blow which produced it; for in two equal nonelastic bodies, that body produced

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produced the deepest tone which was struck by the greatest blow.

We now then come to a critical question, What is it that produces the difference of tone in two elastic sounding bells or strings ^a or, what makes one deep and the other shrill? This question has always been hitherto answered by saying, that the depth or height of the note proceeded from the slowness or swiftness of the times of the vibrations. The slowest vibrations, it has been said, are qualified for producing the deepest tones, while the swiftest vibrations produce the highest tones. In this case, an effect has been given for a cause. It is in fact the force with which the sounding string strikes the air when struck upon, that makes the true distinction in the tones of sounds. It is this force, with greater or less impressions, resembling the greater or less force of the blows upon a nonelastic body, which produces correspondent affections of sound. The greatest forces produce the deepest sounds; the high notes are the effect of small efforts. In the same manner a bell, wide at the mouth, gives a grave sound; but if it be very massy withal, that will render it still graver; but if massy, wide, and long or high, that will make the tone deepest of all.

Thus, then, will elastic bodies give the deepest sound, in proportion to the force with which they strike the air: but if we should attempt to increase their force by giving them a stronger blow, this will be in vain; they will still return the same tone; for such is their formation, that they are sonorous only because they are elastic, and the force of this elasticity is not increased by our strength, as the greatness of a pendulum's vibration will not be increased by falling from a greater height.

Now as to the frequency with which elastic strings vibrate the deepest tones, it has been found, that the longest strings have the widest vibrations, and consequently go backward and forward slowest; while, on the contrary, the shortest strings vibrate the quickest, or come and go in the shortest intervals. From hence those who have treated of sounds, have asserted, as was said before, that the tone of the string depended upon the length or the shortness of the vibrations. This, however, is not the case. One and the same string, when struck, must always, like the same pendulum, return precisely similar vibrations: but it is well known, that one and the same string, when struck upon, does not always return precisely the same tone: so that in this case the vibrations follow one rule, and the tone another. The vibrations must be invariably the same in the same string, which does not return the same tone invariably, as is well known to musicians in general. In the violin, for instance, they can easily alter the tone of the string an octave or eight notes higher, by a softer method of drawing the bow; and some are known thus to bring out the most charming airs imaginable. These peculiar tones are by the English fiddlers called *flute-notes*. The only reason, it has been alleged, that can be assigned for the same string thus returning different tones, must certainly be the different force of its strokes upon the air. In one case, it has double the tone of the other;

because upon the soft touches of the bow, only half its elasticity is put into vibration.

This being understood (continue the authors of this theory), we shall be able clearly to account for many things relating to sounds that have hitherto been inexplicable. Thus, for instance, if it be asked, When two strings are stretched together of equal lengths, tensions, and thickness, how does it happen, that one of them being struck, and made to vibrate throughout, the other shall vibrate throughout also; the answer is obvious: The force that the string struck receives is communicated to the air, and the air communicates the same to the similar string; which therefore receives all the force of the former; and the force being equal, the vibrations must be so too. Again: Put the question, If one string be but half the length of the other, and be struck, how will the vibrations be? The answer is, The longest string will receive all the force of the string half as long as itself, and therefore it will vibrate in proportion, that is, through half its length. In the same manner, if the longest string were three times as long as the other, it would only vibrate in a third of its length; or if four times, in a fourth of its length. In short, whatever force the smaller string impresses upon the air, the air will impress a similar force upon the longer string, and partially excite its vibrations.

From hence also we may account for the cause of those Eolian Lyre.

charming melancholy gradations of sound in the Eolian lyre, Plate I. fig. 2.; an instrument (says Sir John Hawkins) lately obtruded upon the public as a new invention, though described above a century ago by Kircher ^{* Vide Kircher's Musurgia lib. ix.}. This instrument is easily made, being nothing more than a long narrow box of thin deal, about 30 inches long, 5 inches broad, and 1½ inches deep, with a circle in the middle of the upper side or belly about 1½ inch diameter pierced with small holes. On this side are seven, ten, or (according to Kircher) fifteen or more strings of very fine gut, stretched over bridges at each end, like the bridge of a fiddle, and screwed up or relaxed with screw-pins (b). The strings are all tuned to one and the same note; and the instrument is placed in some current of air, where the wind can brush over its strings with freedom. A window with the sash just raised to give the air admission, will answer this purpose exactly. Now when the entering air blows upon these strings with different degrees of force, there will be excited different tones of sound; sometimes the blast brings out all the tones in full concert; sometimes it sinks them to the softest murmurs; it feels for every tone, and by its gradations of strength solicits those gradations of sound which art has taken different methods to produce.

It remains, in the last place, to consider (by this theory) the loudness and softness, or, as the musicians speak, the strength and softness of sound. In vibrating elastic strings, the loudness of the tone is in proportion to the deepness of the note; that is, in two strings, all things in other circumstances alike, the deepest tone will be loudest. In musical instruments upon a different principle, as in the violin, it is otherwise;

(b) The figure represents the instrument with ten chords; of which some direct only eight to be tuned unisons, and the two outermost octaves below them. But this seems to be not material.

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wife; the tones are made in such instruments, by a number of small vibrations crowded into one stroke. The refined bow, for instance, being drawn along a string, its roughnesses catch the string at very small intervals, and excite its vibrations. In this instrument, therefore, to excite loud tones, the bow must be drawn quick, and this will produce the greatest number of vibrations. But it must be observed, that the more quick the bow passes over the string, the less apt will the roughness of its surface be to touch the string at every instant; to remedy this, therefore, the bow must be pressed the harder as it is drawn quicker, and thus its fullest sound will be brought from the instrument. If the swiftness of the vibrations in an instrument thus rubbed upon, exceed the force of the deeper sound in another, then the swift vibrations will be heard at a greater distance, and as much farther off as the swiftness in them exceeds the force in the other.

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theory.

By the same theory (it is alleged) may all the phenomena of musical sounds be easily explained.—The fables of the ancients pretend, that music was first found out by the beating of different hammers upon the smith's anvil. Without pursuing the fable, let us endeavour to explain the nature of musical sounds by a similar method. Let us suppose an anvil, or several similar anvils, to be struck upon by several hammers of different weights or forces. The hammer, which is double that of another, upon striking the anvil will produce a sound double that of the other: this double sound musicians have agreed to call an Octave. The ear can judge of the difference or resemblance of these sounds with great ease, the numbers being as one and two, and therefore very readily compared. Suppose that a hammer, three times less than the first, strikes the anvil, the sound produced by this will be three times less than the first: so that the ear, in judging the similitude of these sounds, will find somewhat more difficulty; because it is not so easy to tell how often one is contained in three, as it is to tell how often it is contained in two. Again, Suppose that a hammer four times less than the first strikes the anvil, the ear will find greater difficulty still in judging precisely the difference of the sounds; for the difference of the numbers four and one cannot so soon be determined with precision as three and one. If the hammer be five times less, the difficulty of judging will be still greater. If the hammer be six times less, the difficulty still increases, and so also of the seventh, so that the ear cannot always readily and at once determine the precise gradation. Now, of all comparisons, those which the mind makes most easily, and with least labour, are the most pleasing. There is a certain regularity in the human soul, by which it finds happiness in exact and striking, and easily made comparisons. As the ear is but an instrument of the mind, it is therefore most pleased with the combination of any two sounds, the differences of which it can most readily distinguish. It is more pleased with the concord of two sounds which are to each other as one and two, than of two sounds which are as one and three, or one and four, or one and five, or one and six or seven. Upon this pleasure, which

the mind takes in comparison, all harmony depends. The variety of sounds is infinite: but because the ear cannot compare two sounds so as readily to distinguish their discriminations when they exceed the proportion of one and seven, musicians have been content to confine all harmony within that compass, and allowed but seven notes in musical composition.

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Let us now then suppose a stringed instrument fitted up in the order mentioned above. For instance: Let the first string be twice as long as the second; let the third string be three times shorter than the first; let the fourth be four times, the fifth string five times, and the sixth six times as short as the first. Such an instrument would probably give us a representation of the lyre as it came first from the hand of the inventor. This instrument will give us all the seven notes following each other, in the order in which any two of them will accord together most pleasingly; but yet it will be a very inconvenient and a very disagreeable instrument: inconvenient, for in a compass of seven strings only, the first must be seven times as long as the last; and disagreeable, because this first string will be seven times as loud also; so that when the tones are to be played in a different order, loud and soft sounds would be intermixed with most disgusting alternations. In order to improve the first instrument, therefore, succeeding musicians very judiciously threw in all the other strings between the two first, or, in other words, between the two octaves, giving to each, however, the same proportion to what it would have had in the first natural instrument. This made the instrument more portable, and the sounds more even and pleasing. They therefore disposed the sounds between the octave in their natural order, and gave each its own proportional dimensions. Of these sounds, where the proportion between any two of them is most obvious, the concord between them will be most pleasing. Thus octaves, which are as two to one, have a most harmonious effect; the fourth and fifth also sound sweetly together, and they will be found, upon calculation, to bear the same proportion to each other that octaves do. "Let it not be supposed (says M. Sauveur), that the musical scale is merely an arbitrary combination of sounds; it is made up from the consonance and differences of the parts which compose it. Those who have often heard a fourth and fifth accord together, will be naturally led to discover their difference at once; and the mind unites itself to their beauties." Let us then cease to assign the coincidences of vibrations as the cause of harmony, since these coincidences in two strings vibrating at different intervals, must at best be but fortuitous; whereas concord is always pleasing. The true cause why concord is pleasing, must arise from our power, in such a case, of measuring more easily the differences of the tones. In proportion as the note can be measured with its fundamental tone by large and obvious distinctions, then the concord is most pleasing; on the contrary, when the ear measures the discriminations of two tones by very small parts, or cannot measure them at all, it loses the beauty of their resemblance: the whole is discord and pain (c).

But

(c) It is certain, that in proportion to the simplicity of relations in sound, the ear is pleased with its combinations; but this is not to be admitted as the cause why musicians have confined all harmony to an octave.

But there is another property in the vibration of a musical string not yet taken notice of, and which is alleged to confirm the foregoing theory. If we strike the string of a harpsichord, or any other elastic sounding chord whatever, it returns a continuing sound. This till of late was considered as one simple uniform tone; but all musicians now confess, that instead of one tone it actually returns four tones, and that constantly. The notes are, beside the fundamental tone, an octave above, a twelfth above, and a seventeenth. One of the bass notes of a harpsichord has been dissected in this manner by Rameau, and the actual existence of these tones proved beyond a possibility of being controverted. In fact, the experiment is easily tried; for if we smartly strike one of the lower keys of a harpsichord, and then take the finger briskly away, a tolerable ear will be able to distinguish, that, after the fundamental tone has ceased, three other shriller tones will be distinctly heard; first the octave above, then the twelfth, and lastly the seventeenth: the octave above is in general almost mixed with the fundamental tone, so as not to be easily perceived, except by an ear long habituated to the minute discriminations of sounds. So that we may observe, that the smallest tone is heard last, and the deepest and largest one first: the two others in order.

In the whole theory of sounds, nothing has given greater room for speculation, conjecture, and disappointment, than this amazing property in elastic strings. The whole string is universally acknowledged to be in vibration in all its parts, yet this single vibration returns no less than four different sounds. They who account for the tones of strings by the number of their vibrations, are here at the greatest loss. Daniel Bernouilli supposes, that a vibrating string divides itself into a number of curves, each of which has a peculiar vibration; and though they all swing together in the common vibration, yet each vibrates within itself. This opinion, which was supported, as most geometrical speculations are, with the parade of demonstration, was only born soon after to die. Others have ascribed this to an elastic difference in the parts of the air, each of which, at different intervals, thus received different impressions from the string, in proportion to their elasticity. This is absurd. If we allow the difference of tone to proceed from the force, and not the frequency, of the vibrations, this difficulty will admit of an easy solution. These sounds, though they seem to exist together in the string, actually follow each other in succession: while the vibration has greatest force, the fundamental tone is brought forward: the force of the vibration decaying, the octave is produced, but almost only instantaneously; to this succeeds, with diminished force, the twelfth; and, lastly, the seventeenth is heard to vibrate with great distinctness, while the three other tones are always silent. These sounds, thus excited, are all of them the harmonic tones, whose differences from the fundamental tone are, as was said, strong and

distinct. On the other hand, the discordant tones cannot be heard. Their differences being but very small, they are overpowered, and in a manner drowned in the tones of superior difference: yet not always neither; for Daniel Bernouilli has been able, from the same stroke, to make the same string bring out its harmonic and its discordant tones also (D). So that from hence we may justly infer, that every note whatsoever is only a succession of tones; and that those are most distinctly heard, whose differences are most easily perceivable.

To this theory, however, though it has a plausible appearance, there are strong and indeed insuperable objections. The very fundamental principle of it is false. No body whatever, whether elastic or nonelastic, yields a graver sound by being struck with a larger instrument, unless either the sounding body, or that part of it which emits the sound, is enlarged. In this case, the largest bodies always return the gravest sounds.

In speaking of elastic and nonelastic bodies in a musical sense, we are not to push the distinction so far as when we speak of them philosophically. A body is *musically* elastic, all of whose parts are thrown into vibrations so as to emit a sound when only part of their surface is struck. Of this kind are bells, musical strings, and all bodies whatever that are considerably hollow. Musical nonelastics are such bodies as emit a sound only from that particular place which is struck: thus, a table, a plate of iron nailed on wood, a bell sunk in the earth, are all of them nonelastics in a musical sense, though not philosophically so. When a solid body, such as a log of wood, is struck with a switch, only that part of it emits a sound which comes in contact with the switch; the note is acute and loud, but would be no less so though the adjacent parts of the log were removed. If, instead of the switch, a heavier or larger instrument is made use of, a larger portion of its surface then returns a sound, and the note is consequently more grave; but it would not be so, if the large instrument was struck with a sharp edge, or a surface only equal to that of the small one.

In sounds of this kind, where there is only a single thwack, without any repetition, the immediate cause of the gravity or acuteness seems to be the quantity of air displaced by the sounding body; a large quantity of air displaced, produces a grave sound, and a smaller quantity a more acute one, the force wherewith the air is displaced signifying very little. What we here advance is confirmed by some experiments made by Dr. Priestley, concerning the *musical tone* of electrical discharges. The passage being curious, and not very long, we shall here transcribe it.

“As the course of my experiments has required a great variety of electrical explosions, I could not help observing a great variety in the musical tone made by the reports. This excited my curiosity to attempt to reduce this variation to some measure. Accordingly,

Discriminated sounds, whose vibrations either never coincide, or at least very rarely, do not only cease to please, but violently grate the ear. Harmony and discord, therefore, are neither discriminated by the judgment of hearers, nor the institution of musicians, but by their own essential and immutable nature.

(D) Vid. Memoires de l'Academie de Berlin, 1753, p. 153.

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by the help of a couple of spinets, and two persons who had good ears for music, I endeavoured to ascertain the tone of some electrical discharges; and observed, that every discharge made several strings, particularly those that were chords to one another, to vibrate; but one note was always predominant, and sounded after the rest. As every explosion was repeated several times, and three of us separately took the same note, there remained no doubt but that the tone we fixed upon was at least very near the true one. The result was as follows:

“A jar containing half a square foot of coated glass sounded F sharp, concert pitch. Another jar of a different form, but equal surface, sounded the same.

“A jar of three square feet sounded C below F sharp. A battery consisting of sixty-four jars, each containing half a square foot, sounded F below the C.

“The same battery in conjunction with another of thirty-one jars, sounded C sharp. So that a greater quantity of coated glass always gave a deeper note.

“Differences in the degree of a charge in the same jar made little or no difference in the tone of the explosion; if any, a higher charge gave rather a deeper note.”

These experiments show us how much the gravity or acuteness of sounds depend on the quantity of air put in agitation by the sounding body. We know that the noise of the electric explosion, arises from the return of the air into the vacuum produced by the electric flash. The larger the vacuum, the deeper was the note: for the same reason, the discharge of a musket produces a more acute note than that of a cannon; and thunder is deeper than either.

Besides this, however, other circumstances concur to produce different degrees of gravity or acuteness in sounds. The sound of a table struck upon with a piece of wood, will not be the same with that produced from a plate of iron struck by the same piece of wood, even if the blows should be exactly equal, and the iron perfectly kept from vibrating. Here the sounds are generally said to differ in their degrees of acuteness, according to the specific gravities or densities of the substances which emit them. Thus gold, which is the most dense of all metals, returns a much graver sound than silver; and metalline wires, which are more dense than thermals, return a proportionably graver sound. But neither does this appear to be a general rule in which we can put confidence. Bell metal is denser than copper, but it by no means appears to yield a graver sound; on the contrary, it seems very probable, that copper will give a graver sound than bell metal, if both are struck upon in their nonelastic state; and we can by no means think that a bell of pure tin, the least dense of all the metals, will give a more acute sound than one of bell metal, which is greatly more dense. In some bodies hardness seems to have a considerable effect. Glass, which is considerably harder than any metal, gives a more acute sound; bell metal is harder than gold, lead, or tin, and therefore sounds much more acutely; though how far this holds with regard to other substances, there is not a sufficient number of experiments for us to judge.

In bodies musically elastic, the whole substance vibrates with the slightest stroke, and therefore they always give the same note whether they are struck with

a large or with a small instrument; so that striking a part of the surface of any body musically elastic is equivalent, in it, to striking the whole surface of a non-elastic one. If the whole surface of a table was struck with another table, the note produced would be neither more nor less acute whatever force was employed; because the whole surface would then yield a sound, and no force could increase the surface: the sound would indeed be louder in proportion to the force employed, but the gravity would remain the same. In like manner, when a bell, or musical string, is struck, the whole substance vibrates, and a greater stroke cannot increase the substance. Hence we see the fallacy of what is said concerning the Pythagorean anvils. An anvil is a body musically elastic, and no difference in the tone can be perceived whether it is struck with a large or with a small hammer; because either of them are sufficient to make the whole substance vibrate, provided nothing but the anvil is struck upon: smiths, however, do not strike their anvils, but red hot iron laid upon their anvils; and thus the vibrations of the anvil are stopped, so that it becomes a nonelastic body, and the differences of tone in the strokes of different hammers proceed only from the surface of the large hammers covering the whole surface of the iron, or at least a greater part of it than the small ones. If the small hammer is sufficient to cover the whole surface of the iron as well as the large one, the note produced will be the same, whether the large or the small hammer is used.

Lastly, The argument for the preceding theory, grounded on the production of what are called *flute-notes* on the violin, is built on a false foundation; for the bow being lightly drawn on an open string, produces no *flute-notes*, but only the harmonies of the note to which the string is tuned. The *flute-notes* are produced by a particular motion of the bow, quick and near the bridge, and by fingering very gently. By this management, the same sounds are produced, though at certain intervals only, as if the vibrations were transferred to the space between the end of the finger-board and the finger, instead of that between the finger and the bridge. Why this small part of the string should vibrate in such a case, and not that which is under the immediate action of the bow, we must own ourselves ignorant: nor dare we affirm that the vibrations really are transferred in this manner, only the same sounds are produced as if they were.

Though these objections seem sufficiently to overturn the foregoing theory, with regard to acute sounds being the effects of weak strokes, and grave ones of stronger impulses, we cannot admit that longer or shorter vibrations are the occasion of gravity or acuteness in sound. A musical sound, however lengthened, either by string or bell, is only a repetition of a single one, whose duration by itself is but for a moment, and is therefore termed *inappretiable*, like the smack of a whip, or the explosion of an electrical battery. The continuation of the sound is nothing more than a repetition of this instantaneous inappretiable noise after the manner of an echo, and it is only this echo that makes the sound agreeable. For this reason, music is much more agreeable when played in a large hall where the sound is reverberated, than in a small room where there is no such reverberation. For the same reason, the sound of a string is more agreeable when put on a hollow

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low violin than when fastened to a plain board, &c.—In the sound of a bell we cannot avoid observing this echo very distinctly. The sound appears to be made up of distinct pulses, or repetitions of the same note produced by the stroke of the hammer. It can by no means be allowed, that the note would be more acute though these pulses were to succeed one another more rapidly; the sound would indeed become more simple, but would still preserve the same tone.—In musical strings the reverberations are vastly more quick than in bells; and therefore their sound is more uniform or simple, and consequently more agreeable than that of bells. In musical glasses*, the vibrations must be inconceivably quicker than in any bell or stringed instrument: and hence they are of all others the most simple and the most agreeable, though neither the most acute nor the loudest.—As far as we can judge, quickness of vibration contributes to the uniformity, or simplicity, but not to the acuteness, nor to the loudness, of a musical note.

* See Har-
monica.

It may here be objected, that each of the different pulses, of which we observe the sound of a bell to be composed, is of a very perceptible length, and far from being instantaneous; so that it is not fair to infer that the sound of a bell is only a repetition of a single instantaneous stroke, seeing it is evidently the repetition of a lengthened note.—To this it may be replied, that the inappreciable sound which is produced by striking a bell in a non-elastic state, is the very same which, being first propagated round the bell, forms one of these short pulses that is afterwards re-echoed as long as the vibrations of the metal continue, and it is impossible that the quickness of repetition of any sound can either increase or diminish its gravity.

CHAP. II. Of the Propagation of Sound. Newton's Doctrine explained and vindicated.

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Sound.

THE writers on sound have been betrayed into these difficulties and obscurities, by rejecting the 47th proposition, B. II. of Newton, as inconclusive reasoning. Of this proposition, however, the late ingenious Dr Matthew Young bishop of Clonfert, formerly of Trinity college, Dublin, has given a clear, explanatory, and able defence. He candidly owns that the demonstration is obscurely stated, and takes the liberty of varying, in some degree, from the method pursued by Newton.

“1. The parts of all sounding bodies (he observes), vibrate according to the law of a cycloidal pendulum: for they may be considered as composed of an indefinite number of elastic fibres; but these fibres vibrate according to that law. *Vide Helsham*, p. 270.

“2. Sounding bodies propagate their motions on all sides *in directum*, by successive condensations and rarefactions, and successive goings forward and returnings backward of the particles. *Vide Prop. 43. B. II. Newton. Princip.*

“3. The pulses are those parts of the air which vibrate backwards and forwards; and which, by going forward, strike (*pulsant*) against obstacles. The latitude of a pulse is the rectilineal space through which the motion of the air is propagated during one vibration of the sounding body.

“4. All pulses move equally fast. This is proved

by experiment; and it is found that they describe 1070 Paris feet, or 1142 London feet in a second, whether the sound be loud or low, grave or acute.

“5. Prob. To determine the latitude of a pulse. Divide the space which the pulse describes in a given time (4) by the number of vibrations performed in the same time by the sounding body, (*Cor. 1. Prop. 24. Smith's Harmonics*), the quotient is the latitude.

“M. Sauveur, by some experiments on organ pipes, found that a body, which gives the gravest harmonic sound, vibrates 12 times and a half in a second, and that the shrillest sounding body vibrates 51.100 times in a second. At a medium, let us take the body which gives what Sauveur calls his *fixed sound*: it performs 100 vibrations in a second, and in the same time the pulses describe 1070 Parisian feet; therefore the space described by the pulses whilst the body vibrates once, that is, the latitude, or interval of the pulse, will be 10.7 feet.

“6. Prob. To find the proportion which the greatest space, through which the particles of the air vibrate, bears to the radius of a circle, whose perimeter is equal to the latitude of the pulse.

“During the first half of the progress of the elastic fibre, or sounding body, it is continually getting nearer to the next particle; and during the latter half of its progress, that particle is getting farther from the fibre, and these portions of time are equal (*Helsham*): therefore we may conclude, that at the end of the progress of the fibre, the first particle of air will be nearly as far distant from the fibre as when it began to move; and in the same manner we may infer, that all the particles vibrate through spaces nearly equal to that run over by the fibre.

“Now M. Sauveur (*Acad. Scienc. ann. 1700, p. 141.*) has found by experiment, that the middle point of a chord which produces his *fixed sound*, and whose diameter is $\frac{1}{2}$ th of a line, runs over in its smallest sensible vibrations $\frac{1}{2}$ th of a line, and in its greatest vibrations 72 times that space; that is $72 \times \frac{1}{2}$ of a line, or 4 lines, that is $\frac{1}{3}$ d of an inch.

“The latitude of the pulses of this fixed sound is 10.7 feet (5); and since the circumference of a circle is to its radius as 710 is to 113, the greatest space described by the particles will be to the radius of a circle, whose periphery is equal to the latitude of the pulse as $\frac{1}{3}$ d of an inch is to 1.7029 feet, or 20.4348 inches, that is, as 1 to 61.3044.

“If the length of the string be increased or diminished in any proportion, *ceteris paribus*, the greatest space described by its middle point will vary in the same proportion. For the inflecting force is to the tending force as the distance of the string from the middle point of vibration to half the length of the string (*see Helsham and Martin*); and therefore the inflecting and tending forces being given, the string will vibrate through spaces proportioned to its length; but the latitude of the pulse is inversely as the number of vibrations performed by the string in a given time (5), that is, directly as the time of one vibration, or directly as the length of the string (*Prop. 24. Cor. 7. Smith's Harmonics*); therefore the greatest space through which the middle point of the string vibrates will vary in the direct ratio of the latitude of the pulse, or of the radius of a circle whose circumference is equal

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to the latitude, that is, it will be to that radius as 1 to 61.3044.

“7. If the particles of the aerial pulses, during any part of their vibration, be successively agitated, according to the law of a cycloidal pendulum, the comparative elastic forces arising from their mutual action, by which they will afterwards be agitated, will be such as will cause the particles to continue that motion, according to the same law, to the end of their vibration.

“Let AB, BC, CD, &c. fig. 3. denote the equal distances of the successive pulses; ABC the direction of the motion of the pulses propagated from A towards B; E, F, G, three physical points of the quiescent medium, situated in the right line AC at equal distances from each other; Ee, Ff, Gg, the very small equal spaces through which these particles vibrate; ε, φ, γ, any intermediate places of these points. Draw the right line PS, fig. 4. equal to Ee, bisect it in O, and from the centre O with the radius OP describe the circle SIPb. Let the whole time of the vibration of a particle and its parts be denoted by the circumference of this circle and its proportional parts. And since the particles are supposed to be at first agitated according to the law of a cycloidal pendulum, if at any time PH or PHSb, the perpendicular HL or bl, be let fall on PS, and if Ee be taken equal to PL or Pl, the particle E shall be found in ε. Thus will the particle E perform its vibrations according to the law of a cycloidal pendulum. Prop. 52. B. I. Principia.

“Let us suppose now, that the particles have been successively agitated, according to this law, for a certain time, by any cause whatsoever, and let us examine what will be the comparative elastic forces arising from their mutual action, by which they will afterwards continue to be agitated.

“In the circumference PHSb take the equal arches HI, IK in the same ratio to the whole circumference which the equal right lines EF, FG, have to BC the whole interval of the pulses; and let fall the perpendiculars HL, IM, KN. Since the points E, F, G are successively agitated in the same manner, and perform their entire vibrations of progress and regress while the pulse is propagated from B to C, if PH be the time from the beginning of the motion of E, PI will be the time from the beginning of the motion of F, and PK the time from the beginning of the motion of G; and therefore Ee, Fφ, Gγ will be respectively equal to PL, PM, PN in the progress of the particles. Whence εφ or EF + Fφ - Eε is equal to EF - LM. But εφ is the expansion of EF in the place εφ, and therefore this expansion is to its mean expansion as EF - LM to EF. But LM is to IH as IM is to OP; and IH is to EF as the circumference PHSb is to BC; that is, as OP is to V, if V be the radius of a circle whose circumference is BC; therefore, ex æquo, LM is to EF as IM is to V; and therefore the expansion of EF in the place εφ is to its mean expansion as V - IM is to V; and the elastic force existing between the physical points E and F is to the mean elastic force as

$\frac{1}{V-IM}$ is to $\frac{1}{V}$ (Cotes Pneum. Lect. 9.) By the same argument, the elastic force existing between the physical points F and G is to the mean elastic force as

$\frac{1}{V-KN}$ is to $\frac{1}{V}$; and the difference between these forces is to the mean elastic force as

$\frac{IM-KN}{V^2-V.IM-V.KN+IM.KN}$ is to $\frac{1}{V}$; that is, as $\frac{IM-KN}{V^2}$ is to $\frac{1}{V}$; or as IM - KN is to V; if on-

ly (upon account of the very narrow limits of the vibration) we suppose IM and KN to be indefinitely less than V. Wherefore since V is given, the difference of the forces is as IM - KN, or as HL - IM (because KH is bisected in I); that is, (because HL - IM is to IH as OM is to OI or OP, and IH and OP are given quantities) as OM; that is, if Ff be bisected in Ω as Ωφ.

“In the same manner it may be shown, that if PHSb be the time from the beginning of the motion of E, PHSi will be the time from the beginning of the motion of F, and PHSk the time from the beginning of the motion of G; and that the expansion of EF in the place εφ is to its mean expansion as EF + Fφ - Eε, or as EF + Im is to EF, or as V + bl is to V in its regrefs: and its elastic force to the mean elastic force as

$\frac{1}{V+bl}$ is to $\frac{1}{V}$; and that the difference of the elastic forces existing between E and F, and between F and G is to the mean elastic force as kn - im is to V; that is, directly as Ωφ.

“But this difference of the elastic forces, existing between E and F, and between F and G, is the comparative elastic force by which the physical point φ is agitated: and therefore the comparative accelerating force, by which every physical point in the medium will continue to be agitated both in progress and regress, will be directly as its distance from the middle point of its vibration; and consequently will be such as will cause the particles to continue their motion undisturbed, according to the law of a cycloidal pendulum. Prop. 38. 1. 1. Newton. Principia.

“Newton rejects the quantity $V \times \overline{IM + KN} + IM \times KN$, on supposition that IM and KN are indefinitely less than V. Now, although this may be a reasonable hypothesis, yet, that this quantity may be safely rejected, will, I think, appear in a more satisfactory manner from the following considerations derived from experiment: PS, in its greatest possible state, is to V as 1 is to 61.3044 (6); and therefore IM, or KN, in its greatest possible state, (that is, when the vibrations of the body are as great as possible, and the particle in the middle point of its vibration) is to V as 1 is to 122.6. Hence $V^2 = 15030.76$, $\overline{V \times IM + KN} = 245.2$ and $IM \times KN = 1$; therefore V^2 is to $V^2 - V \times \overline{IM + KN} + IM \times KN$ as 15.03076 is to 14786.56; that is, as 61 is to 60 nearly.

“Hence it appears, that the greatest possible error in the accelerating force, in the middle point, is the $\frac{1}{60}$ th part of the whole. In other points it is much less; and in the extreme points the error entirely vanishes.

“We should also observe, that the ordinary sounds we hear are not produced by the greatest possible vibrations of which the sounding body is capable; and that in general IM and KN are nearly evanescent with respect

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respect to V. And very probably the disagreeable sensations we feel in very loud sounds, arise not only from IM or KN bearing a sensible proportion to V, by which means the cycloidal law of the pulses may be in some measure disturbed, but also from the very law of the motion of the sounding body itself being disturbed. For the proof of this law's being observed by an elastic fibre is founded on the hypothesis that the space, thro' which it vibrates, is indefinitely little with respect to the length of the string. See *Smith's Harmonics*, p. 237. *Hellbom*, p. 270.

" 8. If a particle of the medium be agitated according to the law of a cycloidal pendulum, the comparative elastic force, acting on the adjacent particle, from the instant in which it begins to move, will be such as will cause it to continue its motion according to the same law.

" For let us suppose, that three particles of the medium had continued to move for times denoted by the arches PK, PI, PH, the comparative elastic force, acting on the second during the time of its motion, would have been denoted by HL—IM, that is, would have been directly as MO (7). And if this time be diminished till I becomes coincident with P, that is, if you take the particles in that state when the second is just beginning to move, and before the third particle has yet been set in motion; then the point M will fall on P, and MO become PO; that is, the comparative elastic force of the second particle, at the instant in which it begins to move, will be to the force with which it is agitated in any other moment of time, before the subsequent particle has yet been set in motion, directly as its distance from the middle point of vibration. Now this comparative elastic force, with which the second particle is agitated in the very moment in which it begins to move, arises from the preceding particle's approaching it according to the law of a pendulum; and therefore, if the preceding particle approaches it in this manner, the force by which it will be agitated, in the very moment it begins to move, will be exactly such as should take place in order to move it according to the law of a pendulum. It therefore sets out according to that law, and consequently the subsequent elastic forces, generated in every successive moment, will also continue to be of the just magnitude which should take place, in order to produce such a motion.

" 9. The pulses of the air are propagated from sounding bodies, according to the law of a cycloidal pendulum. The point E, fig. 3. of any elastic fibre producing a sound, may be considered as a particle of air vibrating according to the law of a pendulum (1). This point E will therefore move according to this law for a certain time, denoted by the arch IH, fig. 4, before the second particle begins to move; for sound is propagated in time through the successive particles of air (4). Now from that instant, the comparative elastic force which agitates F, is (8) directly as its distance from the middle point of vibration. F therefore sets out with a motion according to the law of a pendulum: and therefore the comparative elastic force by which it will be agitated until G begins to move, will continue that law (8.) Consequently F will approach G in the same manner as E approached F, and the comparative elastic force of G, from the in-

stant in which it begins to move, will be directly as its distance from the middle point of vibration; and so on in succession. Therefore all the particles of air in the pulses successively set out from their proper places according to the law of a pendulum, and therefore (7) will finish their entire vibrations according to the same law.

" *Cor. 1.* The number of pulses propagated is the same with the number of vibrations of the tremulous body, nor is it multiplied in their progress; because the little physical line *xy*, fig. 3, as soon as it returns to its proper place, will there quiesce; for its velocity which is denoted by the sine IM, then vanishes, and its density becomes the same with that of the ambient medium. This line, therefore, will no longer move, unless it be again driven forwards by the impulse of the sounding body, or of the pulses propagated from it.

" *Cor. 2.* In the extreme points of the little space through which the particle vibrates, the expansion of the air is in its natural state; for the expansion of the physical line is to its natural expansion as $V+IM$ is to V; but IM is then equal to nothing. In the middle point of the progress the condensation is greatest: for IM is then greatest, and consequently the expansion $V-IM$ least. In the middle of the regress, the rarefaction is greatest for *im*, and consequently $V+im$, is then greatest.

" 10. To find the velocity of the pulses, the density and elastic force of the medium being given.

" This is the 49th Prop. B. II. Newton, in which he shows, that whilst a pendulum, whose length is equal to the height of the homogeneous atmosphere, vibrates once forwards and backwards, the pulses will describe a space equal to the periphery of a circle described with that altitude as its radius.

" *Cor. 1.* He thence shows, that the velocity of the pulses is equal to that which a heavy body would acquire in falling down half the altitude of that homogeneous atmosphere; and therefore, that all pulses move equally fast, whatever be the magnitude of PS, or the time of its being described; that is, whether the tone be loud or low, grave or acute. See *Hales de Sonis*, § 49.

" *Cor. 2.* And also, that the velocity of the pulses is in a ratio compounded of the direct subduplicate ratio of the elastic force of the medium, and the inverse subduplicate of its density. Hence sounds move somewhat faster in summer than in winter. See *Hales de Sonis*, p. 141.

" 11. The strength of a tone is as the moment of the particles of air. The moment of these particles (the medium being given) is as their velocity; and the velocity of these particles is as the velocity of the string which sets them in motion (9). The velocities of two different strings are equal when the spaces which they describe in their vibrations are to each other as the times of these vibrations: therefore, two different tones are of equal strength, when the spaces, through which the strings producing them vibrate, are directly as the times of their vibration.

" 12. Let the strength of the tones of the two strings AB, CD, which differ in tension only (fig. 5. 6.) be equal. Quere the ratio of the inflecting forces F and f? From the hypothesis of the equality of the strength of the tones, it follows (11), that the space

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Velocity of Sound. GE must be to the space HF as $f^{\frac{1}{2}}$ to $F^{\frac{1}{2}}$ (*Smith's Harm. Prop. 24. Cor. 4.*) Now the forces inflecting AB, CD, through the equal spaces GE, HP, are to each other as the tending forces, that is, as F to f, (*Malcom's Treatise on Music, p. 52.*) But the force inflecting CD through HP is to the force inflecting it through HF as HP or GE to HF (*ib. p. 47.*), that is by the hyp. as $f^{\frac{1}{2}}$ to $F^{\frac{1}{2}}$. Therefore, *ex æquo*, the forces inflecting AB and CD, when the tones are equally strong, are to each other as $F \times f^{\frac{1}{2}}$ to $f \times F^{\frac{1}{2}}$, or as $F^{\frac{3}{2}}$ to $f^{\frac{3}{2}}$. That is, the forces necessary to produce tones of equal strength in various strings which differ only in tension, are to each other in the subduplicate ratio of the tending forces, that is, inversely as the time of one vibration, or directly as the number of vibrations performed in a given time. Thus, if CD be the acute octave to AB, its tending force will be quadruple that of AB, (*Malcom's Treatise on Music, p. 53.*): and therefore to produce tones of equal strength in these strings, the force impelling CD must be double that impelling AB; and so in other cases.

"Suppose, now, that the strings AB, CD (fig. 6. 7.) differ in length only. The force inflecting AB through GE is to the tending force, which is given, as GE to AG; and this tending force is to the force inflecting CD through the space HP equal to GE, as HD to HP. Therefore, *ex æquo*, the forces inflecting AB and CD through the equal spaces GE and HP, are to each other as HD to AG, or as CD to AB. But the force inflecting CD through HP is to the force inflecting it through HF, as HP or GE to HF, that is, because these spaces are as the times (11), as AB to CD. Therefore, *ex æquo*, the forces inflecting AB and CD, when the tones are equally strong, are to each other in a ratio of equality. Hence we should suppose, that in this case, an equal number of equal impulses would generate equally powerful tones in these strings. But we are to observe, that the longer the string, the greater, *ceteris paribus*, is the space through which a given force inflects it (*Malcom*); and therefore whatever diminution is produced in the spaces through which the strings move in their successive vibrations, arising either from the want of perfect elasticity in the strings, or from the resistance of the air, this diminution will bear a greater proportion to the less space, through which the shorter string vibrates. And this is confirmed by experience; for we find that the duration of the tone and motion of the whole string exceeds that of any of its subordinate parts. Therefore, after a given interval of time, a greater quantity of motion will remain in the longer string; and consequently, after the successive equal impulses have been made, a greater degree of motion will still subsist in it. That is, a given number of equal impulses being made on various strings differing in length only, a stronger sound will be produced in that which is the longer."

CHAP. III. Of the Velocity, &c. of Sound. Axioms.

Velocity of sound. By the experiments of some philosophers it has been proved, that sound travels at about the rate of 1142 feet in a second, or near 13 miles in a minute; nor do any obstacles hinder its progress, a contrary wind only a small matter diminishing its velocity. The method of calculating its progress is easily made known. When

a gun is discharged at a distance, we see the fire long before we hear the sound. If then we know the distance of the place, and know the time of the interval between our first seeing the fire and then hearing the report, this will shew us exactly the time the sound has been travelling to us. For instance, if the gun is discharged a mile off, the moment the flash is seen, you take a watch and count the seconds till you hear the sound; the number of seconds is the time the sound has been travelling a mile. Again, By the above axiom, we are enabled to find the distance between objects that would be otherwise immeasurable. For example, suppose you see the flash of a gun in the night at sea, and tell seven seconds before you hear the report, it follows therefore that the distance is seven times 1142 feet, that is, 24 yards more than a mile and a half. In like manner, if you observe the number of seconds between the lightning and the report of the thunder, you know the distance of the cloud from whence it proceeds.

But according to another philosopher, Dr Thomas Young, the velocity of sound is not quite so great. "It has been demonstrated, he observes, by M. De la Grange and others, that any impression whatever communicated to one particle of an elastic fluid, will be transmitted through that fluid with an uniform velocity, depending on the constitution of the fluid, without reference to any supposed laws of the continuation of that impression. Their theorem for ascertaining this velocity is the same as Newton has deduced from the hypothesis of a particular law of continuation: but it must be confessed, that the result differs somewhat too widely from experiment, to give us full confidence in the perfection of the theory. Corrected by the experiments of various observers, the velocity of any impression transmitted by the common air, may, at an average, be reckoned 1130 feet in a second." (*Phil. Transf. vol. xc. p. 116.*)

Derham has proved by experiment, that all sounds whatever travel at the same rate. The sound of a gun and the striking of a hammer, are equally swift in their motions; the softest whisper flies as swiftly, as far as it goes, as the loudest thunder.

To these axioms we may add the following:

Smooth and clear sounds proceed from bodies that are homogeneous, and of an uniform figure; and harsh or obtuse sounds, from such as are of a mixed matter and irregular figure.

The velocity of sounds is to that of a brisk wind as fifty to one.

The strength of sounds is greatest in cold and dense air, and least in that which is warm and rarified.

Every point against which the pulses of sound strike, becomes a centre from which a new series of pulses are propagated in every direction.

Sound describes equal spaces in equal times.

CHAP. IV. Of Reverberated Sounds.

SOUND, like light, after it has been reflected from several places, may be collected in one point, as into a focus; and it will be there more audible than in any other part, even than at the place from whence it proceeded. On this principle it is that a whispering gallery is constructed.

The

Reverberated Sounds.

Its progress calculated.

Distances calculated by means of sound.

All sounds travel at the same rate.

Reverberated Sounds.
Whispering Gallery.

The form of a whispering gallery must be that of a concave hemisphere (E), as ABC fig. 8.; and if a low sound or whisper be uttered at A, the vibrations expanding themselves every way will impinge on the points DDD, &c. and from thence be reflected to EEE, and from thence to the points F and G, till at last they all meet in C, where, as we have said, the sound will be the most distinctly heard.

Speaking Trumpet.

The augmentation of sound by means of speaking-trumpets, is usually illustrated in the following manner: Let ABC fig. 9. be the tube, BD the axis, and B the mouth-piece for conveying the voice to the tube. Then it is evident when a person speaks at B in the trumpet, the whole force of his voice is spent upon the air contained in the tube, which will be agitated through its whole length, and, by various reflections from the side of the tube to the axis, the air along the middle part of the tube will be greatly condensed, and its *momentum* proportionably increased, so that when it comes to agitate the air at the orifice of the tube AC, its force will be as much greater than what it would have been without the tube, as the surface of a sphere, whose radius is equal to the length of the tube, is greater than the surface of the segment of such a sphere whose base is the orifice of the tube. For a person speaking at B, without the tube, will have the force of his voice spent in exciting concentric superficies of air all round the point B; and when those superficies or pulses of air are diffused as far as D every way, it is plain the force of the voice will there be diffused through the whole superficies of a sphere whose radius is BD; but in the trumpet it will be so confined, that at its exit it will be diffused through so much of that spherical surface of air as corresponds to the orifice of the tube. But since the force is given, its intensity will be always inversely as the number of particles it has to move; and therefore in the tube it will be to that without, as the superficies of such a sphere to the area of the large end of the tube nearly.

“But it is obvious, Dr M. Young observes, that the confinement of the voice can have little effect in increasing the strength of the sound, as this strength depends on the velocity with which the particles move. Were this reasoning conclusive, the voice should issue through the smallest possible orifice; cylindrical tubes would be preferable to any that increased in diameter; and the less the diameter, the greater would be the effect of the instrument; because the plate or mass of air to be moved, would, in that case, be less, and consequently the effect of the voice the greater; all which is contradicted by experience.

“The cause of the increase of sound in these tubes must therefore be derived from some other principles: and among these we shall probably find, that what the ingenious Kircher has suggested in his *Phonurgia* is the most deserving of our attention. He tells us, that “the augmentation of the sound depends on its reflection from the tremulous sides of the tube; which reflections, conspiring in propagating the pulses in the same direction, must increase its intensity.” Newton also seems

to have considered this as the principal cause, in the scholium of Prop. 50. B. II. Princip. when he says, “we hence see why sounds are so much increased in stentorophonic tubes, for every reciprocal motion is, in each return, increased by the generating cause.

“Farther, When we speak in the open air, the effect on the tympanum of a distant auditor is produced merely by a single pulse. But when we use a tube, all the pulses propagated from the mouth, except those in the direction of the axis, strike against the sides of the tube, and every point of impulse becoming a new centre, from whence the pulses are propagated in all directions, a pulse will arrive at the ear from each of those points; thus, by the use of a tube, a greater number of pulses are propagated to the ear, and consequently the sound increased. The confinement too of the voice may have a little effect, though not such as is ascribed to it by some; for the condensed pulses produced by the naked voice, freely expand every way; but in tubes, the lateral expansion being diminished, the direct expansion will be increased, and consequently the velocity of the particles, and the intensity of the sound. The substance also of the tube has its effect; for it is found by experiment, that the more elastic the substance of the tube, and consequently the more susceptible it is of these tremulous motions, the stronger is the sound.

“If the tube be laid on any nonelastic substance, it deadens the sound, because it prevents the vibratory motion of the parts. The sound is increased in speaking-trumpets, if the tube be suspended in the air; because the agitations are then carried on without interruption. These tubes should increase in diameter from the mouth-piece because the parts vibrating in directions perpendicular to the surface will conspire in impelling forward the particles of air, and consequently by increasing their velocity, will increase the intensity of the sound: and the surface also increasing, the number of points of impulse and of new propagation will increase proportionally. The several causes therefore, of the increase of sound in these tubes, Dr Young concludes to be, 1. The diminution of the lateral, and consequently the increase of the direct, expansion and velocity of the included air. 2. The increase of the number of pulses, by increasing the points of new propagation. 3. The reflections of the pulses from the tremulous sides of the tube, which impel the particles of air forward, and thus increase their velocity.” (*Enquiry into the principal Phenomena of Sound*, p. 56).

An echo is a reflection of sound striking against some Echoes object, as an image is reflected in a glass: but it has been disputed what are the proper qualities in a body for thus reflecting sounds. It is in general known, that caverns, grottoes, mountains, and ruined buildings, return this reflection of sound. We have heard of a very extraordinary echo, at a ruined fortress near Louvain, in Flanders. If a person sung, he only heard his own voice, without any repetition: on the contrary, those who stood at some distance, heard the echo but not the voice; but then they heard it with surprising variations, sometimes louder, sometimes softer, now more near,

(E) A cylindric or elliptic arch will answer still better than one that is circular.

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near, then more distant. There is an account in the memoirs of the French Academy, of a similar echo near Rouen.

It has been already observed that every point against which the pulses of sound strike becomes the centre of a new series of pulses, and sound describes equal distances in equal times; therefore, when any sound is propagated from a centre, and its pulses strike against a variety of obstacles, if the sum of the right lines drawn from that point to each of the obstacles, and from each obstacle to a second point, be equal, then will the latter be a point in which an echo will be heard. "Thus let A fig. 10. be the point from which the sound is propagated in all directions, and let the pulses strike against the obstacles C, D, E, F, G, H, I, &c. each of these points becomes a new centre of pulses by the first principle, and therefore from each of them one series of pulses will pass through the point B. Now if the several sums of the right lines $AC+CB$, $AD+DB$, $AE+EB$, $AG+GB$, $AH+HB$, $AI+IB$, &c. be all equal to each other, it is obvious that the pulses propagated from A to these points, and again from these points to B, will all arrive at B at the same instant, according to the second principle; and therefore, if the hearer be in that point, his ear will at the same instant be struck by all these pulses. Now it appears from experiment (see *Muffenbroek*, vol. ii. p. 210.), that the ear of an exercised musician can only distinguish such sounds as follow one another at the rate of 9 or 10 in a second, or any slower rate: and therefore, for a distinct perception of the direct and reflected sound, there should intervene the interval of $\frac{1}{9}$ th of a second; but in this time sound describes $\frac{1142}{9}$ or 127 feet nearly. And therefore, unless the sum of the lines drawn from each of the obstacles to the points A and B exceeds the interval AB by 127 feet, no echo will be heard at B. Since the several sums of the lines drawn from the obstacles to the points A and B are of the same magnitude, it appears that the curve passing through all the points C, D, E, F, G, H, I, &c. will be an ellipse, (*Prop. 14. b. ii. Ham. Con.*) Hence all the points of the obstacles which produce an echo, must lie in the surface of the oblong spheroid, generated by the revolution of this ellipse round its major axis.

"As there may be several spheroids of different magnitudes, so there may be several different echoes of the same original sound. And as there may happen to be a greater number of reflecting points in the surface of an exterior spheroid than in that of an interior, a second or a third echo may be much more powerful than the first, provided that the superior number of reflecting points, that is, the superior number of reflected pulses propagated to the ear, be more than sufficient to compensate for the decay of sound which arises from its being propagated through a greater space. This is finely illustrated in the celebrated echoes at the lake of Killarney in Kerry, where the first return of the sound is much inferior in strength to those which immediately succeed it.

"From what has been laid down it appears, that for the most powerful echo, the sounding body should be in one focus of the ellipse which is the section of the

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echoing spheroid, and the hearer in the other. However, an echo may be heard in other situations, though not so favourably; as such a number of reflected pulses may arrive at the same time at the ear as may be sufficient to excite a distinct perception. Thus a person often hears the echo of his own voice; but for this purpose he should stand at least 63 or 64 feet from the reflecting obstacle, according to what has been said before. At the common rate of speaking, we pronounce not above three syllables and a half, that is, seven half syllables in a second; therefore, that the echo may return just as soon as three syllables are expressed, twice the distance of the speaker from the reflecting object must be equal to 1000 feet; for as sound describes 1142 feet in a second, $\frac{1}{2}$ ths of that space, that is, 1000 feet nearly, will be described while six half or three whole syllables are pronounced; that is, the speaker must stand near 500 feet from the obstacle. And in general, the distance of the speaker from the echoing surface, for any number of syllables, must be equal to the seventh part of the product of 1142 feet multiplied by that number.

"In churches we never hear a distinct echo of the voice, but a confused sound when the speaker utters his words too rapidly; because the greatest difference of distance between the direct and reflected courses of such a number of pulses as would produce a distinct sound, is never in any church equal to 127 feet, the limit of echoes.

"But though the first reflected pulses may produce no echo, both on account of their being too few in number, and too rapid in their return to the ear; yet it is evident, that the reflecting surface may be so formed, as that the pulses which come to the ear after two reflections or more, may, after having described 127 feet or more, arrive at the ear in sufficient numbers, and also so nearly at the same instant, as to produce an echo, though the distance of the reflecting surface from the ear be less than the limit of echoes. This is confirmed by a singular echo in a grotto on the banks of the little brook called the Dinan, about two miles from Castlecomber, in the county of Kilkenny. As you enter the cave, and continue speaking loud, no return of the voice is perceived; but on your arriving at a certain point, which is not above 14 or 15 feet from the reflecting surface, a very distinct echo is heard. Now this echo cannot arise from the first course of pulses that are reflected to the ear, because the breadth of the cave is so small, that they would return too quickly to produce a distinct sensation from that of the original sound: it therefore is produced by those pulses, which, after having been reflected several times from one side of the grotto to the other, and having run over a greater space than 127 feet, arrive at the ear in considerable numbers, and not more distant from each other, in point of time, than the ninth part of a second."

To what has been said of reflected sounds, we shall add an extract on the same subject from the ingenious paper which we have already quoted.

"M. De la Grange has also demonstrated, that all impenetrable are reflected by an obstacle terminating an elastic fluid, with the same velocity with which they arrived at that obstacle. When the walls of a passage,

or

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ments, &c.

or of an unfurnished room, are smooth and perfectly parallel, any explosion, or a stamping with the foot, communicates an impression to the air, which is reflected from one wall to the other, and from the second again towards the ear, nearly in the same direction with the primitive impulse: this takes place as frequently in a second, as double the breadth of the passage is contained in 1130 feet; and the ear receives a perception of a musical sound, thus determined in its pitch by the breadth of the passage. On making the experiment, the result will be found accurately to agree with this explanation. If the sound is predetermined, and the frequency of vibrations such as that each pulse, when doubly reflected, may coincide with the subsequent impulse proceeding directly from the sounding body, the intensity of the sound will be much increased by the reflection; and also, in a less degree, if the reflected pulse coincides with the next but one, the next but two, or more, of the direct pulses. The appropriate notes of a room may readily be discovered by fingering the scale in it; and they will be found to depend on the proportion of its length or breadth to 1130 feet. The sound of the stopped diapason pipes of an organ is produced in a manner somewhat similar to the note from an explosion in a passage; and that of its reed pipes to the resonance of the voice in a room: the length of the pipe in one case determining the sound, in the other, increasing its strength. The frequency of the vibrations does not at all immediately depend on the diameter of the pipe. It must be confessed, that much remains to be done in explaining the precise manner in which the vibration of the air in an organ pipe is generated. M. Daniel Bernoulli has solved several difficult problems relating to the subject; yet some of his assumptions are not only gratuitous, but contrary to matter of fact." (*Phil. Transf. vol. xc. p. 118.*)

We shall now close this article with describing a few inventions founded on some of the preceding principles, which may perhaps amuse and not be altogether uninteresting to a number of our readers.

Amusing Experiments and Contrivances.

I. Place a concave mirror of about two feet diameter, as AB, fig. 11, in a perpendicular direction. The focus of this mirror may be at 15 or 18 inches distance from its surface. At the distance of about five or six feet let there be a partition, in which there is an opening EF, equal to the size of the mirror; against this opening must be placed a picture, painted in water colours, on a thin cloth, that the sound may easily pass through it (G).

Behind the partition, at the distance of two or three feet, place another mirror GH, of the same size as the former, and let it be diametrically opposite to it (H).

At the point C let there be placed the figure of a man seated on a pedestal, and let his ear be placed ex-

actly in the focus of the first mirror: his lower jaw must be made to open by a wire, and shut by a spring; and there may be another wire to move the eyes: these wires must pass through the figure, go under the floor, and come up behind the partition.

Let a person, properly instructed, be placed behind the partition near the mirror. You then propose to any one to speak softly to the statue, by putting his mouth to the ear of it, assuring him that it will answer instantly. You then give the signal to the person behind the partition, who, by placing his ear to the focus I, of the mirror GH, will hear distinctly what the other said; and, moving the jaw and eyes of the statue by the wires, will return an answer directly, which will in like manner be distinctly heard by the first speaker.

This experiment appears to be taken from the Century of Inventions of the Marquis of Worcester; whose designs, at the time they were published, were treated with ridicule and neglect as being impracticable, but are now known to be generally, if not universally, practicable. The words of the Marquis are these: "How to make a brazen or stone head in the middle of a great field or garden, so artificial and natural, that though a man speak ever so softly, and even whisper into the ear thereof, it will presently open its mouth, and resolve the question in French, Latin, Welsh, Irish, or English, in good terms, uttering it out of its mouth, and then shut it until the next question be asked."—The two following, of a similar nature, appear to have been inventions of Kircher, by means of which (as he informs us*) he used to "utter feigned and ludicrous consultations, with a view to show the fallacy and imposture of ancient oracles." *Plenuria Nova, sect. vi. c. 1.*

II. Let there be two heads of plaster of Paris, placed on pedestals, on the opposite sides of a room. The communication must be a tin tube of an inch diameter, that must pass from the ear of one head, through the pedestal, under the floor, and go up to the mouth of the other. Observe, that the end of the tube which is next the ear of the one head, should be considerably larger than that end which comes to the mouth of the other. Let the whole be so disposed that there may not be the least suspicion of a communication.

Now, when a person speaks, quite low, into the ear of one built, the sound is reverberated through the length of the tube, and will be distinctly heard by any one who shall place his ear to the mouth of the other. It is not necessary that the tube should come to the lips of the built.—If there be two tubes, one going to the ear, and the other to the mouth of each head, two persons may converse together, by applying their mouth and ear reciprocally to the mouth and ear of the built; and at the same time other persons that stand in the middle of the chamber, between the heads, will not hear any part of their conversation.

III. Place a built on a pedestal in the corner of a The Oraculum, 1st head.

(G) The more effectually to conceal the cause of this illusion, the mirror AB may be fixed in the wainscot, and a gauze or any other thin covering thrown over it, as that will not in the least prevent the sound from being reflected. An experiment of this kind may be performed in a field or garden, between two hedges, in one of which the mirror AB may be placed, and in the other an opening artfully contrived.

(H) Both the mirrors here used may be of tin or gilt pasteboard, this experiment not requiring such as are very accurate.

The con-
versing
Statue.

Amusing
Experi-
ments, &c.

Amusing
Experiments, &c.

room, and let there be two tubes, as in the foregoing amusement, one of which must go from the mouth and the other from the ear of the bust, through the pedestal and the floor, to an under apartment. There may be likewise wires that go from the under jaw and the eyes of the bust, by which they may be easily moved.

A person being placed in the under room, and at a signal given applying his ear to one of the tubes, will hear any question that is asked, and immediately reply; moving at the same time, by means of the wires, the mouth and the eyes of the bust, as if the reply came from it.

A Solar Sonata.

IV. In a large case, such as is used for dials and spring-clocks, the front of which, or at least the lower part of it, must be of glass, covered on the inside with gauze, let there be placed a barrel-organ, which, when wound up, is prevented from playing, by a catch that takes a toothed wheel at the end of the barrel. To one end of this catch there must be joined a wire, at the end of which there is a flat circle of cork, of the same dimension with the inside of a glass tube, in which it is to rise and fall. This tube must communicate with a reservoir that goes across the front part of the bottom of the case, which is to be filled with spirits, such as is used in thermometers, but not coloured, that it may be the better concealed by the gauze.

This case being placed in the sun, the spirits will be rarefied by the heat; and rising in the tube, will lift up the catch or trigger, and set the organ in play: which it will continue to do as long as it is kept in the sun; for the spirits cannot run out of the tube, that part of the catch to which the circle is fixed being prevented from rising beyond a certain point by a check placed over it.

When the machine is placed against the side of a room on which the sun shines strong, it may constantly remain in the same place, if you enclose it in a second case, made of thick wood, and placed at a little distance from the other. When you want it to perform, it will be only necessary to throw open the door of the outer case, and expose it to the sun.

But if the machine be moveable, it will perform in all seasons by being placed before the fire; and in the winter it will more readily stop when removed into the cold.

A machine of this sort is said to have been invented by Cornelius Dreble, in the last century. What the construction of that was, we know not; it might very likely be more complex, but could scarcely answer the intention more readily.

Automatous Harpsichord.

V. Under the keys of a common harpsichord let there be fixed a barrel, something like that in a chamber organ, with stops or pins corresponding to the tunes you would have it play. These stops must be moveable, so that the tunes may be varied at pleasure. From each of the keys let there go a wire perpendicular down:

the ends of these wires must be turned up for about one-fourth of an inch. Behind these wires let there be an iron bar, to prevent them from going too far back. Now, as the barrel turns round, its pins take the ends of the wires, which pull down the keys, and play the harpsichord. The barrel and wires are to be all enclosed in a case.

Amusing
Experiments, &c.

In the chimney of the same room where the harpsichord stands, or at least in one adjacent, there must be a smoke jack, from whence comes down a wire, or cord, that, passing behind the wainscot adjoining the chimney, goes under the floor, and up one of the legs of the harpsichord, into the case, and round a small wheel fixed on the axis of that first mentioned. There should be pulleys at different distances, behind the wainscot and under the floor, to facilitate the motion of the cord.

This machinery may be applied to any other keyed instrument as well as to chimes, and to many other purposes where a regular continued motion is required.

An instrument of this sort may be considered as a perpetual motion, according to the vulgar acceptance of the term; for it will never cease going till the fire be extinguished, or some parts of the machinery be worn out.

VI. At the top of a summer-house, or other building, let there be fixed a vane AB, fig. 12. on which is the

A Ventosal Symphony.

pinion C, that takes the toothed wheel D, fixed on the axis EF, which at its other end carries the wheel G, that takes the pinion H. All these wheels and pinions are to be between the roof and the ceiling of the building. The pinion H is fixed to the perpendicular axis IK, which goes down very near the wall of the room, and may be covered after the same manner as are bell-wires. At the lower end of the axis IK there is a small pinion L, that takes the wheel M, fixed on the axis of the great wheel NO. In this wheel there must be placed a number of stops, corresponding to the tunes it is to play. These stops are to be moveable, that the tunes may be altered at pleasure. Against this wheel there must hang 12 small bells, answering to the notes of the gamut. Therefore, as the wheel turns round, the stops striking against the bells play the several tunes. There should be a fly to the great wheel, to regulate its motion when the wind is strong. The wheel NO, and the bells, are to be enclosed in a case.

There may be several sets of bells, one of which may answer to the tenor, another to the treble, and a third to the bass; or they may play different tunes, according to the size of the wheel. As the bells are small, if they are of silver, their tone will be the more pleasing.

Instead of bells, glasses may be here used, so disposed as to move freely at the stroke of the stops. This machinery may likewise be applied to a barrel-organ; and to many other uses.

A C Q

Acqs.

ACQS, in *Geography*, a town at the foot of the Pyrenean mountains, in the department of Arriège and late province of Foix in France. It takes its name from the hot waters in these parts. E. Long. 1. 40. N. Lat. 43. 0.

A C Q

ACQUAPENDENTE, a pretty large town of Italy, in the territory of the church, and patrimony of St Peter, with a bishop's see. It is seated on a mountain, near the river Paglia, ten miles W. of Orvietto, and 57 N. by W. of Rome. It takes its name from a fall

Acquapendente.

Fig. 1.

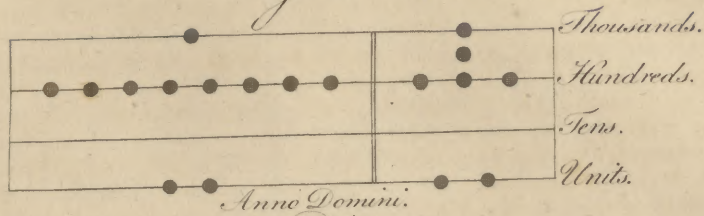


Fig. 2.



ACOUSTICS.

Fig. 1.

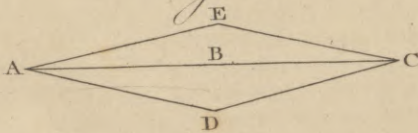


Fig. 2.



Fig. 5.

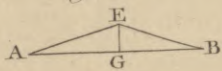


Fig. 6.

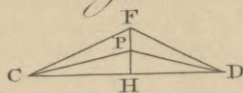


Fig. 7.

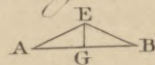


Fig. 4.

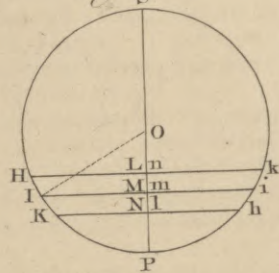


Fig. 3.

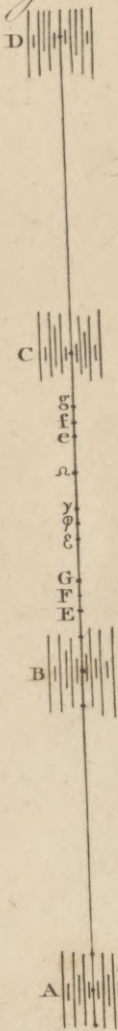


Fig. 8.

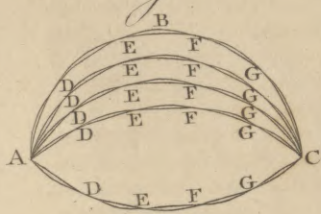


Fig. 10.

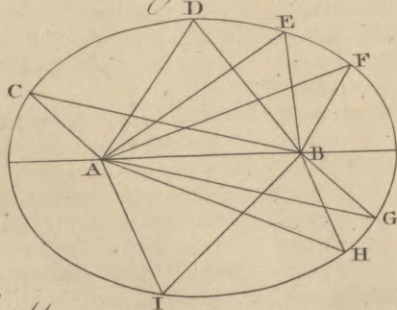


Fig. 9.

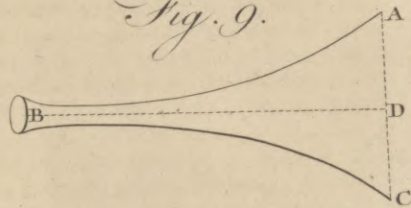


Fig. 11.

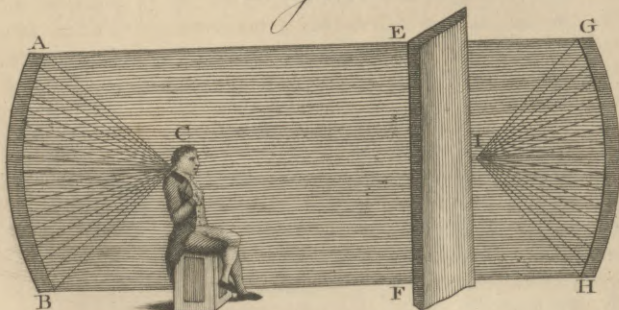
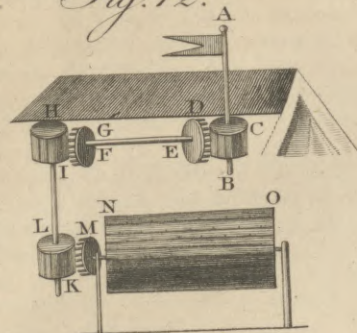


Fig. 12.



At Bell Prin. Wal. Sculptor fecit.

full of water near it, and is now almost desolate. E. Long. 11. 53. N. Lat. 42. 43.

ACQUARIA, a small town of Italy, in Frigiana, a district of Modena, which is remarkable for its medicinal waters. It is 12 miles south of the city of Modena. E. Long. 11. 17. N. Lat. 44. 24.

ACQUEST, or **ACQUIST**, in *Law*, signifies goods got by purchase or donation. See **CONQUEST**.

ACQUI, a town of Italy, in the duchy of Montserrat, with a bishop's see and commodious baths. It was taken by the Spaniards in 1745, and retaken by the Piedmontese in 1746; but after this it was taken again and dismantled by the French, who afterwards forsook it. It is seated on the river Bormia, 25 miles N. W. of Genoa, and 30 S. of Casal. E. Long. 8. 30. N. Lat. 44. 40.

ACQUISITION, in general, denotes the obtaining or procuring something. Among lawyers, it is used for the right or title to an estate got by purchase or donation.

ACQUITTAL, a discharge, deliverance, or setting of a person free from the guilt or suspicion of an offence.

ACQUITTANCE, a release or discharge in writing for a sum of money, witnessing that the party has paid the said sum.—No man is obliged to pay a sum of money if the demandant refuses to give an acquittance. which is a full discharge, and bars all actions, &c. An acquittance given by a servant for a sum of money received for the use of his master, shall be a good discharge for that sum, provided the servant used to receive his master's rents, debts, &c.

ACRA, a town of Africa, on the coast of Guinea, where the English, Dutch, and Danes, have strong forts, and each fort has its particular village. W. Long. 0. 2. N. Lat. 5. 0.

ACRA, in *Ancient Geography*, one of the hills of Jerusalem, on which stood the lower town, which was the old Jerusalem; to which was afterwards added Zion, or the city of David. Probably called *Acra*, from the fortrefs which Antiochus built there in order to annoy the temple, and which Simon Maccabæus took and razed to the ground.

Acra Japygia, in *Ancient Geography*, called *Salentia* by Ptolemy; now *Capo di San Maria di Leuca*: A promontory in the kingdom of Naples, to the south-east of Otranto, where formerly was a town, now lying in ruins, on the Ionian sea, over against the *Montes Acroceramii* of Epirus.

ACRÆ, in *Ancient Geography*, a town of Sicily, whose inhabitants were called *Acrenses*. It stood to the south of Syracuse, at the distance of 24 miles, near the place now called the monastery of *Santa Maria d' Arcia*, on an eminence, as appears from Silius Italicus. The Syracusans were the founders of it, according to Thucydides, 70 years after the building of Syracuse, or 665 before Christ. Hence the epithet *Acreus*.

ACRAGAS, or **AGRAGAS**, in *Ancient Geography*, so called by the Greeks, and sometimes by the Romans, but more generally *Agrigentum* by the latter; a town of Sicily. In Greek medals the inhabitants are called **AKPITANTINOI**, and *Agrigentini* by Cicero. The town stood upon a mountain, at the confluence of the *Acragas* and *Hypsa*, near the port called *Εμποριον* by Ptolemy, but *Επιπλιον*, or the Dock, by Strabo; and in

the time of the latter, scarce a trace of all that side remained. In the year before Christ 584, the people of Gela built *Acragas*, 108 years after building their own city. It took its name from the river running by it; and being but two miles from the sea, enjoyed the conveniences of a sea port. It was a place of great strength, standing on the top of a very steep rock, and washed on the fourth side by the river *Acragas*, now called *Fiume di Gergenti*, and on the south-west by the *Hypsa*, with a citadel to the south-east, externally surrounded by a deep gulf, which made it inaccessible but on the side next the town. It was famous for the tyrant Phalaris and his brazen bull. The Agrigentines were a people luxurious in their tables, and magnificent in their dwellings; of whom Empedocles, in Diogenes Lærtius, says, that they lived to-day as if they were to die tomorrow, and built as if they were to live forever. The country round the city was laid out in vine and olive yards, in the produce of which they carried on a great and profitable commerce with Carthage. E. Long. 13. 30. N. Lat. 37. 20.

ACRAMAR, or **VAN**, in *Geography*, a town and lake of the greater Armenia in Asia. The town, which is large, populous, and commercial, is the capital of the government of Van, is situated at the foot of the mountains of Diarbekir, and is said to have been built by Semiramis. The lake abounds with fish. There are two islands in it which are inhabited by religious Armenians. E. Long. 44. 14. N. Lat. 36. 30.

ACRASIA, among *Physicians*, implies the predominancy of one quality above another, either with regard to artificial mixtures, or the humours of the human body. The word is Greek, and compounded of α privative, and $\kappa\rho\iota\sigma\mu\alpha\tau\iota$, to mix; *q. d.* not mixed in a just proportion.

ACRASUS, in *Ancient Geography*, a town of Asia Minor in Lydia. Some imperial Greek medals of this city still exist, which were struck under the prators, in honour of Severus, and several other emperors.

ACRATH, in *Ancient Geography*, a place in Mauritania Tingitana, now supposed to be *Velex de Gomara*: A fortified town in the kingdom of Fez, with a citadel and commodious harbour on the Mediterranean, scarce a mile distant from Penon de Velex, a Spanish fort. W. Long. 5. N. Lat. 34. 45.

ACRE, or **ACRA**, in *Geography*, a sea-port town in Syria. It was formerly called *Ptolemais*, from one of the Ptolemys; and *Acra* on account of its fortifications; whence the knights of St John of Jerusalem called it St John d'Acra. This city was successively under the dominion of the Romans and the Moors; and was famous in the time of the crusades, and underwent several sieges both by the Christians and Saracens. It is situated at the north angle of a bay, which extends in a semicircle of three leagues, as far as the point of Camel.

During the crusades, the possession of this town was long disputed by the Christians and Saracens. In 1192 it was taken from the latter by Richard I. of England and Philip of France, after a siege of two years, and the slaughter of 100,000 Christians, beside a greater number who perished by shipwreck or disease, who gave it to the knights of St John of Jerusalem. They kept possession of it 100 years, when it was retaken by the Saracens, and almost entirely destroyed. This event

Acre. event is rendered memorable by an act of singular resolution with which it was accompanied. A number of beautiful young nuns, terrified at the prospect of being exposed to the brutal lust of the infidels, determined to avoid the violation of their chastity, by rendering themselves objects of aversion. With this view they cut off their noses and mangled their faces. The Saracens, inflamed with resentment at a spectacle which prevented the gratification of their appetites, immediately put them all to the sword. After the expulsion of the crusaders, it remained almost deserted till about the year 1750, when it was fortified by Daher, an Arabian sheik who maintained his independence against the Ottoman power, till the year 1775, when he was basely assassinated by the emissaries of that government at the age of 86 years. He was adored by his people whom his prudence and valour had through life protected against the tyranny and oppression of the pacha. More lately the works erected by Djezzar, within the last ten years, have rendered it one of the principal towns upon the coast. The mosque of this pacha is boasted as a masterpiece of eastern taste. The bazar, or covered market, is not inferior even to those of Aleppo; and its public fountain surpasses in elegance those of Damascus, though the water is of a very indifferent quality. The pacha has derived the more honour from these works, as he was himself both the engineer and architect: he formed the plans, drew the designs, and superintended the execution.

The port of Acre is one of the best situated on the coast, as it is sheltered from the north and north-west winds by the town itself; but it is greatly choked up since the time of Fakr-el-din. Djezzar contented himself with making a landing place for boats. The fortifications, though more frequently repaired than any other in all Syria, are of no importance: there are only a few wretched low towers near the port, on which cannon are mounted; and these rusty iron pieces are so bad, that some of them burst every time they are fired. Its defence on the land side is merely a garden wall without any ditch.

In the year 1799 Acre was again the scene of war, when it was bravely defended by our gallant countryman Sir Sidney Smith, against the military skill and extraordinary exertions of Bonaparte, and some of his ablest generals. The pacha Djezzar was preparing to evacuate the place, and make good his retreat with his women and treasure, when Sir Sidney with his squadron anchored in the road of Caiffa. The fortifications were repaired under the direction of a skilful engineer, which, with the assistance of the English marines, encouraged and animated the pacha to hold out. After the French had renewed and varied the attack, and being as often repulsed with great slaughter, Bonaparte, despairing of success, raised the siege on the 20th of May, the 61st day after breaking ground.

Corn and cotton form the basis of the commerce of Acre, which is becoming more flourishing every day. Of late, the pacha, by an abuse common throughout all the Turkish empire, has monopolized all the trade in his own hands; no cotton can be sold but to him, and from him every purchase must be made. In vain have the European merchants claimed the privileges granted them by the sultan; Djezzar replied, that he was the sultan in his country, and continued his mo-

nopoly. The merchants were generally French, and they had six houses at Acre, with a consul: an Imperial agent too was lately settled there; also a resident for Russia.

That part of the bay of Acre in which ships anchor with the greatest security lies to the north of Mount Carmel, below the village of Haifa (commonly called *Caiffa*). The bottom is good holding ground, and does not chafe the cables; but the harbour is open to the north-west wind, which blows violently along all this coast. Mount Carmel, which commands it to the south, is a flattened cone, and very rocky; it is about 2000 feet high. We still find among the brambles wild vines and olive trees, which prove that industry has formerly been employed even in this ungrateful soil: on the summit is a chapel dedicated to the prophet Elias, which affords an extensive prospect over the sea and land. It is 20 miles S. of Tyre, and 37 N. of Jerusalem. E. Long. 39. 25. Lat. 32. 40.

ACRE, in the Mogul's dominions, the same with lack, and signifies the sum of 100,000 rupees; the rupee is of the value of the French crown of three livres, or 30 sols of Holland; 100 lacks of rupees make a courou in Indostan, or 10,000,000 rupees: the pound Sterling is about eight rupees; according to which proportion, a lack of rupees amounts to 12,500 pounds Sterling.

ACRE, the universal measure of land in Britain. The word (formed from the Saxon *acher*, or the German *aker*, a field), did not originally signify a determinate quantity of land, but any open ground, especially a wide champaign; and in this antique sense it seems to be preserved in the names of places, as Castle-acre, West-acre, &c. An acre in England contains four square roods, a rood 40 perches or poles of 16½ feet each by statute. Yet this measure does not prevail in all parts of England, as the length of the pole varies in different counties, and is called *customary measure*, the difference running from the 16½ feet to 28. The acre is also divided into 10 square chains, of 22 yards each, that is, 4840 square yards. An acre in Scotland contains four square roods; one square rood is 40 square falls; one square fall, 36 square ells; one square ell, nine square feet and 73 square inches; one square foot, 144 square inches. The Scots acre is also divided into 10 square chains; the measuring chain should be 24 ells in length, divided into 100 links, each link 8 $\frac{2}{10} \frac{3}{10}$ inches; and so one square chain will contain 10,000 square links. The English statute acre is about three roods and six falls standard measure of Scotland.

The French acre, *arpent*, contains $1\frac{1}{4}$ English acre, or 54,450 square English feet, whereof the English acre contains only 43,560.—The Strasburg acre is about half an English acre.—The Welsh acre contains commonly two English ones.—The Irish acre is equal to one acre two roods and 19 perches $\frac{2}{3} \frac{7}{11}$ English.

ACRE-FIGHT, an old sort of duel fought by English and Scottish combatants, between the frontiers of their kingdoms, with sword and lance: it was also called *camp-fight*, and the combatants *champions*, from the open field being the stage of trial.

ACRE-TAX, a tax laid on land at so much per acre. In some places this is also called *acre-shot*. Impositions on lands in the great level are to be raised by a proportionable

Acribeia portionable acre-tax, 20 Car. II. cap. 8.—An acre-tax of 2s. 6d. per acre, for draining Hadenham-level, 13 Geo. I. cap. 18.

ACRIBEIA, a term purely Greek, literally denoting an exquisite or delicate accuracy; sometimes used in our language, for want of a word of equal signification.

ACRID, a name for any thing that is of a sharp or pungent taste. See MATERIA MEDICA.

ACRIDOPHAGI, in *Ancient Geography*, an Ethiopian people, represented as inhabiting near the deserts, and to have fed on locusts. This latter circumstance their name imports; the word being compounded of the Greek *ακρις locust*, and *φαγω to eat*. We have the following account of them by Diodorus Siculus*.

Their stature was lower than that of other men; they were meagre, and extremely black. In the spring, high west winds drove from the desert to their quarter locusts of an extraordinary size, and remarkable for the squalid colour of their wings. So great was the number of these insects, that they were the only sustenance of the barbarians, who took them in the following manner: At the distance of some stadia from their habitations there was a wide and deep valley. They filled this valley with wood and wild herbs, with which their country abounded. When the cloud of locusts appeared, which were driven on by the wind, they set fire to the fuel which they had collected. The smoke which arose from this immense fire was so thick, that the locusts, in crossing the valley, were stifled by it, and fell in heaps on the ground. The passage of the locusts being thus intercepted for many days, they made a large provision of those insects. As their country produced great quantities of salt, they salted them, to render them more palatable, and to make them keep till the next season. This peculiar supply was their sole food: they had neither herds nor flocks. They were unacquainted with fishing; for they lived at a distance from the sea. They were very active, and ran with great swiftness. But their life was not of long duration; it exceeded not forty years. The close of their life was extremely miserable; for in their old age, winged lice of different, but all of ugly forms, bred in their bodies. This malady, which began in the breast and belly, soon spread through the whole frame. The patient at first felt an itching; and the agreeable sensation produced by his scratching of himself, preceded a most deplorable calamity. For when those lice, which had bred in his body, forced their way out, they caused effusions of corrupt blood, with excruciating pains in the skin. The unhappy man, with lamentable cries, was industrious himself to make passages for them with his nails. In short, these lice issued forth successively from the wounds made by the hands of the patient, as from a vessel full of holes, and in such numbers that it was impossible to exterminate them.—Whether this extraordinary and dreadful distemper was occasioned by the food of the inhabitants of this country, or by a pestilential quality of their climate, it is difficult to determine. Indeed, as to the credibility of the whole account, we must leave the reader to judge.

But though the circumstances of these people should be deemed fabulous, yet may the *acridophagia* be true. It is well known, that to this day the inhabitants of

Ethiopia, Arabia, &c. frequently use locusts as food. The reader will not be displeas'd if we lay before him the result of Dr Hasselquist's inquiries as to this particular, who travelled in Syria and Egypt so late as the year 1752. This ingenious gentleman, who travelled with a view to improve natural history, informs us, that he ask'd Franks, and many other people who had lived long in these countries, whether they had ever heard that the inhabitants of Arabia, Ethiopia, &c. used locusts as food? They answered, that they had. He likewise ask'd the same question of Armenians, Copts, and Syrians, who lived in Arabia, and had travelled in Syria and near the Red sea; some of whom said they heard of such a practice, and others that they had often seen the people eat these insects. He at last obtained complete satisfaction on this head from a learned sheikh at Cairo, who had lived six years in Mecca. This gentleman told him, in presence of M. le Grand the principal French interpreter at Cairo, and others, that a famine frequently rages at Mecca when there is a scarcity of corn in Egypt, which obliges the inhabitants to live upon coarser food than ordinary: That when corn is scarce, the Arabians grind the locusts in hand mills, or stone mortars, and bake them into cakes, and use these cakes in place of bread: That he has frequently seen locusts used by the Arabians, even when there was no scarcity of corn; but then they boil them, stew them with butter, and make them into a kind of fricassée; which he says is not disagreeably tasted, for he had sometimes tasted these locust fricassées out of curiosity.

A later traveller, Dr Sparrman, informs us,* * *Voyage to the Cape*, vol. i. p. 36.
“That locusts sometimes afford a high treat to the more unpolished and remote hordes of the Hottentots; when, as sometimes happens, after an interval of 8, 10, 15, or 20 years, they make their appearance in incredible numbers. At these times they come from the north, migrating to the southward, and do not suffer themselves to be impeded by any obstacles, but fly boldly on, and are drowned in the sea whenever they come to it. The females of this race of insects, which are most apt to migrate, and are chiefly eaten, are said not to be able to fly; partly by reason of the shortness of their wings, and partly on account of their being heavy and distended with eggs; and shortly after they have laid these in the sand, they are said to die. It is particularly of these that the Hottentots make a brown coffee-coloured soup, which at the same time, acquires from the eggs a fat and greasy appearance. The Hottentots are highly rejoiced at the arrival of these locusts, though they are sure to destroy every bit of verdure on the ground; but the Hottentots make themselves ample amends for this loss, by falling foul on the animals themselves, eating them in such quantities as in the space of a few days to get visibly fatter and in better condition than before.”

The Abbé Poiret, also, in his Memoir on the Insects of Barbary and Numidia, informs us, “That the Moors make locusts a part of their food; that they go to hunt them; fry them in oil and butter; and sell them publicly at Tunis, at Bonne,” &c.

From these accounts, we may see the folly of that dispute among divines about the nature of St John's food in the wilderness: some maintaining the original word to signify the fruits of certain trees; others, a kind

* Lib. iii. and xxxix. Also Strabo, lib. xvi.

Acrobates.

of birds, &c.: but those who adhered to the literal meaning of the text were at least the most orthodox, although their arguments were perhaps not so strong as they might have been, had they had an opportunity of quoting such authors as the above.

ACRILII MONTES, in *Ancient Geography*, mountains in the island of Sicily which are also called *Herai*.

ACRILLEÆ, a city of Sicily between Acree and Agrigentum, not far from Syracuse, supposed to be the fame with Acila which is mentioned by Plutarch.

ACRISIUS, in *Fabulous History*, king of Argos, being told by the oracle that he should be killed by his grand-child, shut up his only daughter Danaë in a brazen tower: but Jupiter coming down in a golden shower, begot Perseus upon her. After Perseus had slain the Gorgons, he carried Medusa's head to Argos; which Acrisius seeing, was turned into a statue.

ACRISTIA, in *Geography*, a town of Sicily, 23 miles west north-west of Magara. It is built on the ruins of the ancient town of Schritea.

ACRITAS, in *Ancient Geography*, a promontory of Messenia, running into the sea, and forming the beginning of the bay of Messene. Now called *Capo di Gallo*, between Methone to the west, and Corone to the east, where the Sinus Coronensis begins.

ACROAMATIC, or ACROATIC, in general, denotes a thing sublime, profound, or abstruse.

ACROAMATICI, a denomination given to the disciples or followers of Aristotle, &c. who were admitted into the secrets of the inner or acroamatic philosophy.

ACROATHOUM, or ΑΚΡΟΘΟΥΜ, in *Ancient Geography*, a town situated on the top of Mount Athos, where the inhabitants, according to Mela, were longer lived by half than in any other country; called by the modern Greeks, *Αγιος ορος*; by the Italians *La Cima di Monte Santo*.

ACROATIC is a name given to Aristotle's lectures to his disciples, which were of two kinds, *exoteric* and *acroatic*. The acroatic were those to which only his own disciples and intimate friends were admitted; whereas the exoteric were public and open to all. But there are other differences. The acroatic were set apart for the higher and more abstruse subjects; the exoteric were employed in rhetorical and civil speculations. Again, the acroatics were more subtle and exact, evidence and demonstration being here aimed at; the exoterics chiefly aimed at the probable and plausible. The former were the subject of the mornings exercises in the Lyceum, the latter of the evenings. Besides, the exoterics were published: whereas the acroatics were kept secret; being either entirely concealed, or, if they were published, it was in such obscure terms, that few but his own disciples could be the wiser for them. Hence, when Alexander complained of his preceptor for publishing his acroatics, and thus revealing what should have been reserved to his disciples, Aristotle answered, that they were made public and not public; for that none who had not heard them explained by the author *viva voce*, could understand them.

ACROBATES, in *Antiquity*, were rope-dancers who performed various feats by vaulting or tumbling on a rope; sliding down on a rope from a lofty station

with arms and legs extended, in imitation of flying; and running, dancing, and leaping, on a rope stretched horizontally.

ACROBATICA, or ACROBATICUM, from *ακροβ*, high, and *βασις*, or *βασος*, I go; an ancient engine whereby people were raised aloft, that they might see more conveniently about them. The *acrobatia* among the Greeks amounted to the same with what they call *scenorium* among the Latins. Authors are divided as to the use of this engine. Turnebus and Barbarus take it to have been of the military kind, raised by besiegers, high enough to overlook the walls, and discover the state of things on the other side. Baldus rather supposes it a kind of moveable scaffold, or cradle, contrived for raising painters, plasterers, and other workmen, to the tops of houses, trees, &c. Some suspect that it might have been used for such purposes; which is the opinion of Vitruvius and Aquinas.

ACROCERAUNIA, or MONTES CERAUNII, in *Ancient Geography*, mountains running out into the sea (so called from their being often thunderstruck), separating the Ionian sea from the Adriatic; where Illyria ends and Epirus begins: now called *Monti della Chimera*.

ACROCHERISMUS, among the Greeks, a sort of gymnastic exercise, in which the two combatants contended with their hands and fingers only, without closing or engaging the other parts of the body.

ACROCORINTHUS, in *Ancient Geography*, a high and steep hill, hanging over the city of Corinth, which was taken within the walls, as an acropolis, or citadel. On its top stood a temple of Venus; and lower down issued the fountain Pyrene.

ACROMION, in *Anatomy*, the upper part of the scapula or shoulder blade. See ANATOMY.

ACROMONOGRAMMATICUM, in *Poetry*, a kind of poem, wherein every subsequent verse begins with the letter wherewith the immediately preceding one terminated.

ACRON, a celebrated physician of Agrigentum, in Sicily, who lived about the middle of the fifth century before Christ. He first thought of lighting large fires, and purifying the air with perfumes, to put a stop to the pestilence that ravaged Athens, and which was attended with success. He wrote two treatises, according to Suidas, in the Doric dialect; the one on physic, and the other on abstinence or diet.

ACRON, in *Geography*, a territory on the Gold coast of Guinea, in Africa, bordering on the Fantynean country. The Dutch have a fort here called Fort Patience; and under it is a village, inhabited only by fishermen. The other inhabitants are added to husbandry, and sell their corn to other countries. There is plenty of game, which is very commodious for the Dutch factory. The people are very ignorant, and go naked like the rest of the negroes. This is called Little Acron; for Great Acron is farther inland, and is a kind of a republic.

ACRONICAL, ACHRONICAL, or ACHRONICAL, in *Astronomy*, is a term applied to the rising of a star, when the sun is set in the evening; but has been promiscuously used to express a star's rising at sunset, or setting at sunrise.

ACRONIUS LACUS (Mela); a small lake formed by the Rhine, soon after its rise out of the Alps, and after

Acrobatica
Acronius.

Acropolis
||
Acrotholium.

after passing the greater lake at Constance, called *Venetus*, and now the *Bodensee*, or lake of Constance.

ACROPOLIS, in *Ancient Geography*, the citadel, and one of the divisions of Athens; called *Polis*, because constituting the first and original city; and the *Upper Polis*, to distinguish it from the lower, which was afterwards built round it in a large open plain, the Acropolis standing on a rock or eminence in the heart of this plain; and hence its name: To the north it had a wall, built by the Pelasgi, and therefore called *Pelasgic*; and to the south a wall, by Cimon the son of Miltiades, out of the Persian spoils, many ages after the building of the north wall. It had nine gates, and was therefore called *Eneapylon*; yet but one principal gate or entrance, the ascent to which was by a flight of steps of white marble, built in a magnificent manner by Pericles, (Plutarch).

ACROPOLITA, GEORGE, one of the writers in the Byzantine history, was born at Constantinople, in the year 1220, and educated at the court of the emperor John Ducas at Nice. He was employed in the most important affairs of the empire; being sent ambassador to Larissa, to establish a peace with Michael of Epirus; and was constituted judge to try Michael Comnenus, who was suspected of engaging in a conspiracy. Theodorus Lascaris, the son of John, whom he had taught logic, appointed him governor of all the western provinces in his empire. In 1255, he was taken prisoner in a war with Michael Angelus; but gaining his liberty in 1260, by means of the emperor Palæologus, he was sent by him ambassador to Constantine prince of Bulgaria: and was employed in several other negotiations. He wrote, *A Continuation of the Greek History*, from the taking of Constantinople by the Latins till it was recovered by Michael Palæologus in 1261, which makes part of the Byzantine history; *A Treatise concerning Faith, Virtue, and the Soul*; *An Exposition of the Sermons of St Gregory Nazianzen*, and other pieces. Gregory Cyprian, patriarch of Constantinople, in his encomium upon him, prefixed to Acropolita's history, is perhaps somewhat extravagant in his praise, when he says he was equal to Aristotle in philosophy; and to Plato in the knowledge of divine things and Attic eloquence.

ACROSPIRE, a vulgar term for what botanists call the *plumes*.

ACROSPIRED, in *Malt-making*, is the grain's shooting both at the root and blade end.

ACROSTIC, in *Poetry*, a kind of poetical composition, disposed in such a manner, that the initial letters of the verses form the name of some person, kingdom, place, motto, &c. The word is compounded of the Greek *akros*, *extremity*, and *stichos*, *verse*. The acrostic is considered by the critics as a species of false wit, and is therefore very little regarded by the moderns.

ACROSTICHUM, RUSTYBACK, WALL-RUE, or FORK-FERN. See *BOTANY Index*.

ACROSTOLIUM, in *Ancient Naval Architecture*, the extreme part of the ornament used on the prows of ships, which was sometimes in the shape of a buckler, helmet, animal, &c. but more frequently circular, or spiral. It was usual to tear them from the prows of vanquished vessels, and fix them to the con-

querors, as a signal of victory. They were frequently represented on the reverse of ancient medals.

ACROTELEUTIC, among *Ecclesiastic Writers*, an appellation given to any thing added to the end of a psalm; as the *Gloria Patri*, or *Doxology*.

ACROTERRI, in *Geography*, a small town in the island of Santorin. N. Lat. 36. 25. E. Long. 26. 1.

ACROTERRIA, in *Architecture*, small pedestals, usually without bases, anciently placed at the middle or two extremes of pediments or frontispieces, serving to support the statues, &c. It also signifies the figures placed as ornaments on the tops of churches, and the sharp pinnacles that stand in ranges about flat buildings with rails and balusters.

Among ancient physicians, it signified the larger extremities of the body, as the head, hands, and feet. It has also been used for the tips of the fingers, and sometimes for the eminences or processes of bones.

ACROTHYMION, from *akros*, *extreme*, and *thymos*, *thyme*. A sort of wart described by Celsus as hard and rough, with a narrow basis and broad top; the top is of the colour of thyme, it easily splits and bleeds. This tumour is also called *thymus*.

ACT, in general, denotes the exertion of power; and differs from power, as the effect from the cause.

ACT, in *Logic*, is particularly understood of an operation of the human mind. Thus to discern and examine, are acts of the understanding; to judge and affirm, are acts of the will. There are voluntary and spontaneous acts; the former are produced by the operation of the soul, the latter without its privity or participation.

ACT, in the *Universities*, signifies a thesis maintained in public by a candidate for a degree; or to show the capacity and proficiency of a student. The candidates for a degree of bachelor and master of arts are to hold philosophical acts; and those for bachelor of divinity, theological acts, &c. At Oxford, the time when masters or doctors complete their degrees, is also called the *act*; which is held with great solemnity. At Cambridge, they call it the *commencement*.

Act of Faith, Auto da Fe, in the *Romish Church*, is a solemn day held by the inquisition, for the punishment of heretics, and the abolition of the innocent accused*. They usually contrive the *Auto* to fall on some great festival, that the execution may pass with the more awe and regard; at least it is always on a Sunday.

The *Auto da Fe* may be called the last act of the inquisitorial tragedy; it is kind of gaol-delivery, appointed as oft as a competent number of prisoners in the inquisition are convicted of heresy, either by their own voluntary or extorted confession, or on the evidence of certain witnesses. The process is thus: In the morning they are brought into a great hall, where they have certain habits put on, which they are to wear in the procession. The procession is led up by Dominican friars; after which come the penitents, some with san-benitoes, and some without, according to the nature of their crimes; being all in black coats without sleeves, and barefooted, with a wax candle in their hands. These are followed by the penitents who have narrowly escaped being burnt, who over their black coats have flames painted with their points turned downwards,

Acroteleu-
tic
||
Act.

* See *Inquisition*.

A.C.

wards, *Fuego revuelto*. Next come the negative and relapsed, who are to be burnt, having flames on their habits pointing upwards. After these come such as profess doctrines contrary to the faith of Rome, who, besides flames pointing upwards, have their picture painted on their breasts, with dogs, serpents, and devils, all open mouthed, about it. Each prisoner is attended with a familiar of the inquisition; and those to be burnt have also a Jesuit on each hand, who are continually preaching to them to abjure. After the prisoners comes a troop of familiars on horseback; and after them the inquisitors, and other officers of the court, on mules; last of all, the inquisitor-general on a white horse, led by two men with black hats and green hat-bands. A scaffold is erected in the *Torriero de Pazo*, big enough for two or three thousand people; at one end of which are the prisoners, at the other the inquisitors. After a sermon made up of encomiums of the inquisition, and invectives against heretics, a priest ascends a desk near the middle of the scaffold, and having taken the abjuration of the penitents, recites the final sentence of those who are to be put to death; and delivers them to the secular arm, earnestly beseeching at the same time the secular power not to touch their blood, or put their lives in danger. The prisoners being thus in the hands of the civil magistrate, are presently loaded with chains, and carried first to the secular gaol, and from thence in an hour or two brought before the civil judge; who, after asking in what religion they intend to die, pronounces sentence, on such as declare they die in the communion of the church of Rome, that they shall be first strangled, and then burnt to ashes; on such as die in any other faith, that they be burnt alive. Both are immediately carried to the Ribera, the place of execution; where there are as many stakes set up as there are prisoners to be burnt, with a quantity of dry furze about them. The stakes of the professed, that is, such as persist in their heresy, are about four yards high, having a small board towards the top for the prisoner to be seated on. The negative and relapsed being first strangled and burnt, the professed mount their stakes by a ladder; and the Jesuits, after several repeated exhortations to be reconciled to the church, part with them, telling them they leave them to the devil, who is standing at their elbow to receive their souls, and carry them with him into the flames of hell. On this a great shout is raised; and the cry is, Let the dogs *beards be made*; which is done by thrusting flaming furzes fastened to long poles against their faces, till their faces are burnt to a coal, which is accompanied with the loudest acclamations of joy. At last, fire is set to the furze at the bottom of the stake, over which the professed are chained so high, that the top of the flame seldom reaches higher than the seat they sit on; so that they rather seem roasted than burnt. There cannot be a more lamentable spectacle; the sufferers continually cry out, while they are able, *Misericordia per amor de Dios*, "Pity for the love of God!" yet it is heheld by all sexes and ages with transports of joy and satisfaction.

A.C. in *Dramatic Poetry*, signifies a certain division or part of a play, designed to give some respite both to the actors and spectators. The Romans were the first who divided their theatrical pieces into acts; for no such divisions appear in the works of the first dra-

A.C.

matic poets. Their pieces indeed consisted of several parts or divisions, which they called *protasis*, *epitasis*, *catastasis*, and *catastrophe*; but these divisions were not marked by any real interruptions in the theatre. Nor does Aristotle mention any thing of acts in his Art of Poetry. But, in the time of Horace, all regular and finished pieces were divided into five acts.

*Neve minor, neu sit quinto productior actu
Fabula, quae posci vult, et spectata reponi.*

If you would have your play deserve success,
Give it five acts complete, nor more nor less.

FRANCIS.

The first act, according to some critics, besides introducing upon the stage the principal characters of the play, ought to propose the argument or subject of the piece; the second, to exhibit this to the audience, by carrying the fable into execution; the third, to raise obstacles and difficulties; the fourth, to remove these, or raise new ones in the attempt; and the fifth, to conclude the piece, by introducing some accident that may unravel the whole affair. This division, however, is not essentially necessary; but may be varied according to the humour of the author, or the nature of the subject. See *POETRY*.

Act of Grace. See *GRACE*.

ACT, among *Lawyers*, is an instrument in writing for declaring or justifying the truth of any thing. In which sense, records, decrees, sentences, reports, certificates, &c. are called *acts*.

ACTS also denote the deliberations and resolutions of an assembly, senate, or convention; as acts of parliament, &c. Likewise matters of fact transmitted to posterity in certain authentic books and memoirs.

ACTA Consistorii, the edicts or declarations of the council of state of the emperors. These edicts were generally expressed in such terms as these: "The august emperors, *Dioclesian* and *Maximin*, in council declared, That the children of decurions should not be exposed to wild beasts in the amphitheatre."

The senate and soldiers often swore, either through abject flattery or by compulsion, upon the *edicts* of the emperor, as we do upon the *Bible*. And the name of *Apidius Merula* was erased by Nero out of the register of senators, because he refused to swear upon the edicts of the emperor Augustus.

ACTA Diurna, was a sort of Roman gazette, containing an authorized narrative of the transactions worthy of notice which happened at Rome. Petronius has given us a specimen of the *acta diurna* in his account of Trimalchis; and as it may not perhaps be unentertaining to see how exactly a Roman newspaper runs in the style of an English one, the following is an article or two out of it:

"On the 26th of July, 30 boys and 40 girls were born at Trimalchi's estate at Cuma.

"At the same time a slave was put to death for uttering disrespectful words against his lord.

"The same day a fire broke out in Pompey's gardens, which began in the night, in the steward's apartment."

ACTA Populi, among the Romans, were journals or registers of the daily occurrences; as assemblies, trials, executions, buildings, births, marriages, deaths, &c.

Acta. of illustrious persons, and the like. These were otherwise called *Acta Publica* and *Acta Diurna*, or simply *Acta*. The *Acta* differed from *Annals*, in that only the greater and more important matters were in the latter, and those of less note were in the former. Their origin is attributed to Julius Cæsar, who first ordered the keeping and making public the acts of the people. Some trace them higher, to Servius Tullius; who, to discover the number of persons born, dead, and alive, ordered that the next of kin, upon a birth, should put a certain piece of money into the treasury of Juno Lucina; upon a death, into that of Venus Libitina: the like was also to be done upon assuming the toga virilis, &c. Under Marcus Antoninus, this was carried further: persons were obliged to notify the births of their children, with their names and surnames, the day, consul, and whether legitimate or spurious, to the prefects of the *Ærarium Saturni*, to be entered in the public acts; though before this time the births of persons of quality appear thus to have been registered.

Acta Senatus, among the Romans, were minutes of what passed and was debated in the senate house. These were also called *Commentarii*, and by a Greek name *ἱστορικὰ*. They had their origin in the consulship of Julius Cæsar, who ordered them both to be kept and published. The keeping them was continued under Augustus, but the publication was abrogated. Afterwards all writings, relating to the decrees or sentences of the judges, or what passed and was done before them, or by their authority, in any cause, were also called by the name *Acta*: In which sense we read of civil acts, criminal acts, intervenient acts; *acta civilia, criminalia, intervenientia*, &c.

Public Acts. The knowledge of public acts forms part of a peculiar science, called the *DIPLOMATIC*, of great importance to an historian, statesman, chronologer, and even critic. The preservation of them was the first occasion of erecting libraries. The style of acts is generally barbarous Latin. Authors are divided as to the rules of judging of their genuineness, and even whether there be any certain rules at all. F. Germon will have the greater part of the acts of former ages to be spurious. Fontanini asserts, that the number of forged acts now extant is very small. It is certain there were severe punishments inflicted on the forgers and falsifiers of acts.—The chief of the English acts, or public records, are published by Rymer, under the title of *Fœdera*, and continued by Saunderson; an extract whereof has been given in French by Rapin, and translated into English under the title of *Acta Regia*. Great commendations have been given this work: also some exceptions made to it; as that there are many spurious acts, as well as errors, in it; some have even charged it with falsifications.—The public acts of France fell into the hands of the English after the battle of Poitiers, and are commonly said to have been carried by them out of the country. But the tradition is not supported by any sufficient testimony.

Acts of the Apostles, one of the sacred books of the New Testament, containing the history of the infant church, during the space of 29 or 30 years from the ascension of our Lord to the year of Christ 63.—It was written by St Luke; and addressed to Theophilus, the person to whom the evangelist had before dedicated his Gospel. We here find the accomplishment of several of

the promises made by our Saviour; his ascension; the descent of the Holy Ghost; the first preaching of the apostles, and the miracles whereby their doctrines were confirmed; an admirable picture of the manners of the primitive Christians; and, in short, every thing that passed in the church till the dispersion of the apostles, who separated themselves in order to propagate the gospel throughout the world. From the period of that separation, St Luke quits the history of the other apostles, who were then at too great a distance from him, and confines himself more particularly to that of St Paul, who had chosen him for the companion of his labours. He follows that apostle in all his missions, and even to Rome itself; for it appears that the Acts were published in the second year of St Paul's residence in that city, or the 36th year of the Christian era, and in the 9th or 10th year of Nero's reign. The style of this work, which was originally composed in Greek, is much purer than that of the other canonical writers; and it is observable, that St Luke, who was much better acquainted with the Greek than with the Hebrew language, always, in his quotations from the Old Testament, makes use of the Septuagint version. The council of Laodicea places the Acts of the Apostles among the canonical books, and all the churches have acknowledged it as such without any controversy.

There were several *Spurious Acts* of the *APOSTLES*; particularly, 1. *Acts*, supposed to be written by Abdias*, the pretended bishop of Babylon, who gave out that he was ordained bishop by the apostles themselves when they were upon their journey into Persia. 2. *The Acts of St Peter*: this book came originally from the school of the Ebionites. 3. *The Acts of St Paul*; which is entirely lost. Eusebius, who had seen it, pronounces it of no authority. 4. *The Acts of St John the Evangelist*; a book made use of by the Encratites, Manichæans, and Priscillianists. 5. *The Acts of St Andrew*; received by the Manichæans, Encratites, and Apotactics. 6. *The Acts of St Thomas the Apostle*; received particularly by the Manichæans. 7. *The Acts of St Philip*. This book the Gnostics made use of. 8. *The Acts of St Matthias*. Some have imagined that the Jews for a long time had concealed the original acts of the life and death of St Matthias written in Hebrew; and that a monk of the abbey of St Matthias at Treves, having got them out of their hands, procured them to be translated into Latin, and published them; but the critics will not allow them to be authentic.

Acts of Pilate; a relation sent by Pilate to the emperor Tiberius, concerning Jesus Christ, his death, resurrection, ascension, and the crimes of which he was convicted before him †. It was a custom among the Romans, that the præconsuls and governors of provinces should draw up acts, or memoirs, of what happened in the course of their government, and send them to the emperor and senate. The genuine acts of Pilate were sent by him to Tiberius, who reported them to the senate; but they were rejected by that assembly, because not immediately addressed to them: as is testified by Tertullian, in his *Apol.* cap. 5. and 20, 21. The heretics forged acts in imitation of them: in the reign of the emperor Maximin, the Gentiles, to throw an odium on the Christian name, spread about spurious Acts of Pilate; which the emperor, by a solemn edict, ordered

Acts.

† Eusebii
Hist. Eccles.
lib. ii. cap. 2.
and ix. 5.

Act
||
Actio.

ordered to be sent into all the provinces of the empire, and enjoined the schoolmasters to teach and explain them to their scholars, and make them learn them by heart. These acts, both the genuine and the spurious, are lost. There is indeed extant, in the Pseudo-Hege-sippus, a letter from Pilate to the emperor Claudius, concerning Jesus Christ; but it discovers itself at first sight not to be authentic.

† *Cave Hist. Literar.*
Sec. *Apostol.*

Act of Parliament is a positive law, consisting of two parts, the words of the act, and its true sense and meaning; which being joined, make the law. The words of acts of parliament should be taken in a lawful sense. Cases of the same nature are within the intention, though without the letter, of the act; and some acts extend by equity to things not mentioned therein. See PARLIAMENT.

ACTÆ, were meadows of remarkable verdure and luxuriance near the sea-shore, where the Romans used to indulge themselves to a great degree in softness and delicacy of living. The word is used in this sense by Cicero and Virgil; but Vossius thinks it can only be used in speaking of Sicily, as these two authors did.

ACTÆA, HERB-CRISTOPHER, or BANE-BERRIES: See BOTANY *Index*.

ACTÆON, in *Fabulous History*, the son of Aristæus and Autonoe; a great hunter. He was transformed by Diana into stag, because he looked on her while bathing; and was devoured by his own dogs. The effects of impertinent curiosity and expensive pleasures seem to be the moral of the fable.

ACTANIA, an island, according to Pliny, in the North sea. It lies to the west of Holstein and Dithmarsch, not far from the mouth of the Eyder and Elbe, and is now called *Heyligland*.

ACTE. See SAMBUCUS.

ACTIAN GAMES, in *Roman Antiquity*, were solemn games instituted by Augustus, in memory of his victory over Mark Antony at Actium, held every fifth year, and celebrated in honour of Apollo, since called *Actius*. Hence *Actian Years*, an era commencing from the battle of Actium, called the *Era of Augustus*.

Virgil insinuates them to have been instituted by Æneas; from that passage, Æn. III. v. 280.

Actiaque Iliacis celebramus littora ludis.

ÆN. III. 280.

But this he only does by way of compliment to Augustus: attributing that to the hero from whom he descended, which was done by the emperor himself; as is observed by Servius.

ACTINIA, in *Zoology*, a genus belonging to the order of Vermes mollusca, called *Animal Flowers*, and *Sea Anemonies*. See VERMES.

ACTINOLITE, in *Mineralogy*. See MINERALOGY *Index*.

ACTIO, in *Roman Antiquities*, an action at law in a court of justice. The formalities used by the Romans, in judicial actions, were these: If the difference failed to be made up by friends, the injured person proceeded *in jus reum vocare*, to summon the offending party to the court, who was obliged to go, or give bond for his appearance.

The offending party might be summoned into court *viva voce*, by the plaintiff himself meeting the defendant, declaring his intention to him, and commanding

him to go before the magistrate and make his defence. If he would not go willingly, he might drag and force him along, unless he gave security for his appearance on some appointed day. If he failed to appear on the day agreed on, then the plaintiff, whensoever he met him, might take him along with him by force, calling any by-standers to bear witness, by asking them *quisne antestari?* the by-standers upon this turned their ear toward him in token of their consent: To this Horace alludes in his satire against the impertinent, Lib. I. Sat. 9. See this further explained under the article ANTESTARI.

Actio,
Action.

Both parties being met before the prætor, or other supreme magistrate presiding in the court, the plaintiff proposed the action to the defendant, in which he designed to prosecute him. This they termed *edere actionem*; and was commonly performed by writing it in a tablet, and offering it to the defendant, that he might see whether he had better stand the suit or compound.

In the next place came the *postulatio actionis*, or the plaintiff's petition to the prætor, for leave to prosecute the defendant in such an action. The petition was granted by writing at the bottom of it *actionem do*, or refused by writing in the same manner *actionem non do*.

The petition being granted, the plaintiff *vadabatur reum*, i. e. obliged him to give sureties for his appearance on such a day in the court; and this was all that was done in public, before the day fixed upon for the trial.

In the mean time, the difference was often made up, either *transfatione*, by letting the cause fall as dubious; or *passione*, by composition for damages amongst friends.

On the day appointed for hearing, the prætor ordered the several bills to be read, and the parties summoned by an *accensus*, or beadle. See ACCENSI.

Upon the nonappearance of either party, the defaulter lost his cause: if they both appeared, they were said *se stetisse*; and then the plaintiff proceeded *litem sive actionem intendere*, i. e. to prefer his suit, which was done in a set form of words, varying according to the difference of the actions. After this the plaintiff desired judgment of the prætor, that is, to be allowed a *judex* or *arbiter*, else the *recuperatores* or *centumviri*. These he requested for the hearing and deciding the business; but none of them could be desired but by the consent of both parties.

The prætor having assigned them their judges, defined and determined the number of witnesses to be admitted, to hinder the protracting of the suit; and then the parties proceeded to give their caution, that the judgment, whatever it was, should stand and be performed on both sides. The judges took a solemn oath to be impartial; and the parties took the *juramentum calumnie*. Then the trial began with the assistance of witnesses, writings, &c. which was called *disceptatio cause*.

ACTION, in a general sense, implies nearly the same thing with Act.—Grammarians, however, observe some distinction between *action* and *act*; the former being generally restricted to the common or ordinary transactions, whereas the latter is used to express those which are remarkable. Thus, we say it is a good *actio*

Action. *action* to comfort the unhappy; it is a generous *act* to deprive ourselves of what is necessary for their sake. The wise man proposes to himself an honest end in all his actions; a prince ought to mark every day of his life with some act of greatness. The Abbé Girard makes a further distinction between the words *action* and *act*. The former, according to him, has more relation to the power that acts than the latter; whereas the latter has more relation to the effect produced than the former: and hence the one is properly the attribute of the other. Thus we may properly say, "Be sure to preserve a presence of mind in all your actions; and take care that they be all acts of equity."

ACTION, in *Mechanics*, implies either the effort which a body or power makes against another body or power, or the effect itself of that effort.

As it is necessary, in works of this kind, to have a particular regard to the common language of mechanics and philosophers, we have given this double definition: but the proper signification of the term is the motion which a body really produces, or tends to produce, in another; that is, such is the motion it would have produced, had nothing hindered its effect.

All power is nothing more than a body actually in motion, or which tends to move itself; that is, a body which would move itself if nothing opposed it. The action therefore of a body is rendered evident to us by its motion only; and consequently we must not fix any other idea to the word action, than that of actual motion, or a simple tendency to motion. The famous question relating to *vis viva*, and *vis mortua*, owes, in all probability, its existence to an inadequate idea of the word action; for had Leibnitz and his followers observed, that the only precise and distinct idea we can give to the word force or action, reduces it to its effect, that is, to the motion it actually produces or tends to produce, they would never have made that curious distinction.

Quantity of ACTION, a name given by M. de Maupertuis, in the Memoirs of the Parisian Academy of Sciences for 1744, and those of Berlin for 1746, to the product of the mass of a body by the space which it runs through, and by its celerity. He lays it down as a general law, "that, in the changes made in the state of a body, the quantity of action necessary to produce such change, is the least possible." This principle he applies to the investigation of the laws of refraction, of equilibrium, &c. and even to the ways of acting employed by the Supreme Being. In this manner M. de Maupertuis attempts to connect the metaphysics of final causes with the fundamental truths of mechanics, to show the dependence of the collision of both elastic and hard bodies upon one and the same law, which before had always been referred to separate laws; and to reduce the laws of motion, and those of equilibrium, to one and the same principle.

ACTION, in *Ethics*, denotes the external signs or expressions of the sentiments of a moral agent. See *Active Power*, *infra*.

ACTION, in *Poetry*, the same with subject or fable. Critics generally distinguish two kinds, the principal and the incidental. The principal action is what is generally called the *fable*; and the incidental an *episode*. See *POETRY*.

ACTION, in *Oratory*, is the outward deportment of

the orator, or the accommodation of his countenance, voice, and gesture, to the subject of which he is treating. See *ORATORY*.

ACTION, in a theatrical sense. See *DECLAMATION*.

ACTION for the Pulpit. See *DECLAMATION*.

ACTION, in *Painting* and *Sculpture*, is the attitude or position of the several parts of the face, body, and limbs, of such figures as are represented, and whereby they seem to be really actuated by passions. Thus we say, the action of such a figure finely expresses the passions with which it is agitated: we also use the same expression with regard to animals.

ACTION, in *Physiology*, is applied to the functions of the body, whether vital, animal, or natural.

The vital functions, or actions, are those which are absolutely necessary to life, and without which there is no life; as the action of the heart, lungs, and arteries. On the action and reaction of the solids and fluids on each other, depend the vital functions. The pulse and respiration are the external signs of life. Vital diseases are all those which hinder the influx of the venous blood into the cavities of the heart, and the expulsion of the arterial blood from the same.—The natural functions are those which are instrumental in repairing the several losses which the body sustains; for life is destructive of itself, its very offices occasioning a perpetual waste. The manducation of food, the deglutition and digestion thereof, also the separation and distribution of the chyle and excrementitious parts, &c. are under the head of natural functions, as by these our aliment is converted into our nature. They are necessary to the continuance of our bodies.—The animal functions are those which we perform at will, as muscular motion, and all the voluntary actions of the body: they are those which constitute the senses of touch, taste, smell, sight, hearing, perception, reasoning, imagination, memory, judgment, affections of the mind. Without any, or all of them, a man may live, but not so comfortably as with them.

ACTION, in *Commerce*, is a term used abroad for a certain part or share of a public company's capital stock. Thus, if a company has 400,000 livres capital stock, this may be divided into 400 actions, each consisting of 1000 livres. Hence a man is said to have two, four, &c. actions, according as he has the property of two, four, &c. 1000 livres capital stock. The transferring of actions abroad is performed much in the same manner as stocks are with us. See *STOCKS*.

ACTION, in *Law*, is a demand made before a judge for obtaining what we are legally entitled to demand, and is more commonly known by the name of *law-suit* or *process*. See *SUIT*.

ACTIONARY, or **ACTIONIST**, a proprietor of stock in a trading company.

ACTIONS, among *Merchants*, sometimes signify moveable effects; and we say the merchant's creditors have seized on all his actions, when we mean that they have taken possession of all his active debts.

ACTIVE, denotes something that communicates action or motion to another; in which acceptation it stands opposed to passive.

ACTIVE, in *Grammar*, is applied to such words as express action; and is therefore opposed to passive. The active performs the action, as the passive receives it.

Activity Thus we say, a verb *active*, a conjugation *active*, &c. or an *active* participle.

||
Acton.

ACTIVE Verbs, are such as do not only signify doing, or acting, but have also nouns following them, to be the subject of the action or impression: Thus, *To love, to teach*, are verbs *active*; because we can say, *To love a thing, to teach a man*. Neuter verbs also denote an action, but are distinguished from active verbs, in that they cannot have a noun following them: such are, *To sleep, to go*, &c. Some grammarians, however, make three kinds of active verbs: the *transitive*, where the action passes into a subject different from the agent; *reflected*, where the action returns upon the agent; and *reciprocal*, where the action turns mutually upon the two agents who produced it.

ACTIVE Power, in *Metaphysics*, the power of executing any work or labour; in contradistinction to *speculative* powers*, or the powers of seeing, hearing, remembering, judging, reasoning, &c.

The exertion of active power we call *action*; and as every action produces some change, so every change must be caused by some effect, or by the cessation of some exertion of power. That which produces a change by the exertion of its power, we call the *cause* of that change; and the change produced, the *effect* of that cause. See METAPHYSICS.

ACTIVE Principles, in *Chemistry*, such as are supposed to act without any assistance from others; as mercury, sulphur, &c.

ACTIVITY, in general, denotes the power of acting, or the active faculty. See ACTIVE.

Sphere of ACTIVITY, the whole space in which the virtue, power, or influence, of any object is exerted.

ACTIUM, in *Ancient Geography*, a town situated on the coast of Acarnania, in itself inconsiderable, but famous for a temple of Apollo, a safe harbour, and an adjoining promontory of the same name, in the mouth of the Sinus Ambracius, over against Nicopolis, on the other side of the bay: it afterwards became more famous on account of Augustus's victory over Antony and Cleopatra; and for quinquennial games instituted there, called *Aetia* or *Ludi Aetiaci*. Hence the epithet *Aetius*, given to Apollo (Virgil). *Aetiacra*, a computation of time from the battle of Actium. The promontory is now called *Capo di Figalo*. The medals of Actium were silver, gold and bronze; and the ordinary type is a flying pegasus.

ACTIUS, in *Mythology*, a surname of Apollo, from Actium, where he was worshipped.

ACTON, a town near London, where is a well that affords a purging water, which is noted for the pungency of its salt. This water is whitish; to the taste it is sweetish, with a mixture of the same bitter which is in the Epsom water. The salt of this water is not quite so soft as that of Epsom; and is more calcareous than it, having more of the salt of lime: for a quantity of the Acton water being boiled high, and mixed with a solution of sublimate in pure water, threw down a yellow sediment. The salt of the Acton water is more nitrous than that of Epsom; it strikes a deep red, or purple, with the tincture of logwood in brandy, as is usual with nitrous salts; it does not precipitate silver out of the spirit of nitre, as common salt does: 1½ lb. of this water yields 48 grains of salt.

ACTOR, in general, signifies a person who acts or performs something.

Actor,
Actorum.

ACTOR, among *Civilians*, the proctor or advocate in civil courts or causes; as, *Actor ecclesiae* has been sometimes used for the advocate of the church; *actor dominicus* for the lord's attorney; *actor villæ*, the steward or head bailiff of a village.

ACTOR, in the *Drama*, is a person who represents some part or character in the theatre. The drama consisted originally of nothing more than a simple chorus, who sung hymns in honour of Bacchus; so that the primitive actors were only singers and musicians. Theopis was the first that, in order to ease this unformed chorus, introduced a declaimer, who repeated some heroic or comic adventure. Æschylus, finding a single person tiresome, attempted to introduce a second, and changed the ancient recitals into dialogues. He also dressed his actors in a more majestic manner, and introduced the cothurnus or buskin. Sophocles added a third, in order to represent the various incidents in a more natural manner: and here the Greeks stopped, at least we do not find in any of their tragedies above three persons in the same scene. Perhaps they looked upon it as a rule of the dramatic poem never to admit more than three speakers at a time on the stage; a rule which Horace has expressed in the following verse:

Nec quarta loqui persona laboret.

This however, did not prevent their increasing the number of actors in comedy. Before the opening of a play, they named their actors in full theatre, together with the parts they were to perform. The ancient actors were masked, and obliged to raise their voice extremely, in order to make themselves heard by the innumerable crowd of people who filled the amphitheatres: they were accompanied with a player on the flute, who played a prelude, gave them the tone, and played while they declaimed. Horace speaks of a kind of secondary actors in his time, whose business was to imitate the first; and lessen themselves, to become better foils to their principals.

The moderns have introduced an infinite number of actors upon the stage. This heightens the trouble and distress that should reign there, and makes a diversity, in which the spectator is sure to be interested.

Actors were highly honoured at Athens. At Rome they were despised, and not only denied all rank among the citizens, but even when any citizen appeared upon the stage, he was expelled his tribe and deprived of the right of suffrage by censors. Cicero, indeed, esteems the talents of Roscius: but he values his virtues still more; virtues which distinguished him so remarkably above all others of his profession, that they seemed to have excluded him from the theatre. The French have, in this respect, adopted the ideas of the Romans; and the English those of the Greeks.

ACTOR, the name of several persons in fabulous *History*. One *Actor* among the *Aurunci* is described by Virgil as a hero of the first rank. *Æn.* xii.

ACTORUM TABULÆ, in *Antiquity*, were tables instituted by Servius Tullius, in which the births of children were registered. They were kept in the treasury of Saturn.

ACTRESS,

* Dr Reid
on the Ac-
tive Powers
of Man,
p. 12.

Actress
||
Actuarius.

ACTRESS, in a general sense, a female who acts or performs something.

ACTRESS, in the *Drama*, a female performer. Women actors were unknown to the ancients, among whom men always performed the female character; and hence one reason for the use of masks among them.

Actresses are said not to have been introduced on the English stage till after the restoration of King Charles II. who has been charged with contributing to the corrupting of our manners by importing this usage from abroad. But this can be but partly true: the queen of James I. acted a part in a pastoral; and Prynne, in his *Histriomastix*, speaks of women actors in his time as prostitutes; which was one occasion of the severe prosecution brought against him for that book.

There are some very agreeable and beautiful talents, of which the possession commands a certain sort of admiration; but of which the exercise for the sake of gain is considered, whether from reason or prejudice, as a sort of public prostitution. The pecuniary recompense, therefore, of those who exercise them in this manner, must be sufficient, not only to pay for the time, labour, and expence of acquiring the talents, but for the discredit which attends the employment of them as the means of subsistence. The exorbitant rewards of players, opera-singers, opera-dancers, &c. are founded upon these two principles; the rarity and beauty of the talents, and the discredit of employing them in this manner. It seems absurd at first sight that we should despise their persons, and yet reward their talents with the most profuse liberality. While we do the one, however, we must of necessity do the other. Should the public opinion or prejudice ever alter with regard to such occupations, their pecuniary recompense would quickly diminish. More people would apply to them, and the competition would quickly reduce the price of their labour. Such talents, though far from being common, are by no means so rare as is imagined. Many people possess them in great perfection, who disdain to make this use of them; and many more are capable of acquiring them, if any thing could be made honourably by them.

ACTUAL, something that is real and effective, or that exists truly and absolutely. Thus philosophers use the terms *actual* heat, *actual* cold, &c. in opposition to *virtual* or *potential*. Hence, among physicians, a red hot iron, or fire, is called an *actual* cautery; in distinction from cauterics, or caustics, that have the power of producing the same effect upon the animal solids as *actual* fire, and are called *potential* cauterics. Boiling water is actually hot; brandy, producing heat in the body, is potentially hot, though of itself cold.

ACTUAL Sin, that which is committed by the person himself; in opposition to *original sin*, or that which he contracted from being a child of Adam.

ACTUARIÆ NAVES, a kind of long and light ships among the Romans, thus denominated, because they were chiefly designed for swiftness and expedition. They correspond to what the French call *brigantines*.

ACTUARIUS, a celebrated Greek physician of the 13th century, and the first Greek author who has treated of mild purgatives, such as cassia, manna, sena, &c. He is the first also who mentions distilled waters.

His works were printed in one volume folio, by Henry Stephens, in 1567.

ACTUARIUS, or ACTARIUS, a notary or officer appointed to write the acts or proceedings of a court, or the like. In the Eastern empire, the actuarii were properly officers who kept the military accounts, received the corn from the *susceptores* or storekeepers, and delivered it to the soldiers.

ACTUATE, to bring into act, or put a thing in action. Thus an agent is said, by the schoolmen, to *actuate* a power, when it produces an act in a subject. Thus the mind may be said to *actuate* the body; and thus a medicine is said by some ancient physicians to be actuated or brought into action, when by means of the vital heat it is made to produce its effect.

ACTUS, in *Ancient Architecture*, a measure in length equal to 120 Roman feet. In *Ancient Agriculture*, the word signified the length of one furrow, or the distance a plough goes before it turns.

Actus Minimus was a quantity of land 120 feet in length, and four in breadth.

Actus Major, or *Actus Quadratus*, a piece of ground in a square form, whose side was equal to 120 feet, equal to half the jugerum.

Actus Intervicinalis, a space of ground four feet in breadth, left between the lands as a path or way.

ACUANITES, in *Ecclesiastical History*, the same with those called more frequently MANICHEES. They took the name from Acua, a disciple of Thomas one of the twelve apostles.

ACULEATE, or ACULEATI, a term applied to any plant or animal armed with prickles.

ACULEI, the prickles of animals or of plants.

ACULER, in the *Manege*, is used for the motion of a horse, when, in working upon volts, he does not go far enough forward at every time or motion, so that his shoulders embrace or take in too little ground, and his croupe comes too near the centre of the volt. Horses are naturally inclined to this fault in making demi-volts.

ACUMINA, in *Antiquity*, a kind of military omen, most generally supposed to have been taken from the points or edges of darts, swords, or other weapons.

ACUNA, CHRISTOPHER DE, a Spanish Jesuit, born at Burgos. He was admitted into the society in 1612, being then but 15 years of age. After having devoted some years to study, he went to America, where he assisted in making converts in Chili and Peru. In 1640 he returned to Spain, and gave the king an account how far he had succeeded in the commission he had received to make discoveries on the river of the Amazons; and the year following he published a description of this river at Madrid. Acuna was sent to Rome, as procurator of his province. He returned to Spain with the title of Qualificator of the Inquisition; but soon after embarked again for the West Indies, and was at Lima in 1675, when Father Southwell published at Rome the *Bibliothèque* of the Jesuit writers. Acuna's work is entitled, *Novo descubrimiento del gran río de las Amazonas*; i. e. "A new discovery of the great river of the Amazons." He was 10 months together upon this river, having had instructions to inquire into every thing with the greatest exactness, that his majesty might thereby be enabled to render the navigation more easy and commodious. He

Actuate
||
Acuna.

Acupunc-
ture
||
Ad.

went aboard a ship at Quito with Peter Texiera, who had already been so far up the river, and was therefore thought a proper person to accompany him in this expedition. They embarked in February 1639, but did not arrive at Para till the December following. It is thought that the revolutions of Portugal, by which the Spaniards lost all Brazil, and the colony of Para at the mouth of the river of the Amazons, were the cause that the relation of this Jesuit was suppressed; for, as it could not be of any advantage to the Spaniards, they were afraid it might prove of great service to the Portuguese. The copies of this work became extremely scarce, so that the publishers of the French translation at Paris asserted, that there was not one copy of the original extant, excepting one in the possession of the translator, and perhaps that in the Vatican library. M. de Gomberville was the author of this translation: it was published after his death, with a long dissertation. An account of the original may be seen in the Paris Journal; in that of Leipzig, and in Cheverau's History of the World.

ACUPUNCTURE, the name of a surgical operation among the Chinese and Japanese, which is performed by pricking the part affected with a silver needle. They employ this operation in headaches, lethargies, convulsions, colics, &c.

ACUS, in *Ichthyology*, the trivial name of a species of syngnathus. See SYNGNATHUS.

ACUSIO COLONIA, now ANCONA, according to Holstenius, between Orange and Valence, near Moutelimart, on the banks of the Rhone.

ACUTE, an epithet applied to such things as terminate in a sharp point or edge. And in this sense it stands opposed to obtuse.

ACUTE Angle, in *Geometry*, is that which is less than a right angle, or which does not subtend 90 degrees.

ACUTE-angled Triangle, is a triangle whose three angles are all acute.

ACUTE-angled Cone, is, according to the ancients, a right cone, whose axis makes an acute angle with its side.

ACUTE, in *Music*, is applied to a sound or tone that is sharp or high in comparison of some other tone. In this sense, *acute* stands opposed to *grave*.

ACUTE Accent. See ACCENT.

ACUTE Diseases, such as come suddenly to a crisis. This term is used for all diseases which do not fall under the head of chronic diseases.

ACUTIATOR, in writers of the barbarous ages, denotes a person that whets or grinds cutting instruments; called also in ancient glossaries *acutor*, *ακουπτης*, *famarius*, *cobarius*, &c. In the ancient armies there were acutiatores, a kind of smiths, retained for whetting or keeping the arms sharp.

AD, a Latin preposition, originally signifying *to*, and frequently used in composition both with and without the *d*, to express the relation of one thing to another.

Ad Bestias, in *Antiquity*, is the punishment of criminals condemned to be thrown to wild beasts.

Ad Hominem, in *Logic*, a kind of argument drawn from the principles or prejudices of those with whom we argue.

Ad Ludos, in *Antiquity*, a sentence upon criminals

among the Romans, whereby they were condemned to entertain the people by fighting either with wild beasts or with one another, and thus executing justice upon themselves.

Ad Metalla, in *Antiquity*, the punishment of such criminals as were condemned to the mines, among the Romans; and therefore called *Metallici*.

Ad Valorem, a term chiefly used in speaking of the duties or customs paid for certain goods: The duties on some articles are paid by the number, weight, measure, tale, &c.; and others are paid *ad valorem*, that is according to their value.

ADAGE, a proverb, or short sentence, containing some wise observation or popular saying. Erasmus has made a very large and valuable collection of the Greek and Roman adages; and Mr Ray has done the same with regard to the English. We have also Kelly's Collection of Scots Proverbs.

ADAGIO, in *Music*. Adverbially, it signifies *softly*, *leisurely*; and is used to denote the slowest of all times. Used substantively, it signifies a slow movement. Sometimes this word is repeated, as *adagio*, *adagio*, to denote a still greater retardation in the time of the music.

ADALIDES, in the Spanish policy, are officers of justice, for matters touching the military forces. In the laws of King Alphonso, the adalides are spoken of as officers appointed to guide and direct the marching of the forces in time of war. Lopez represents them as a sort of judges, who take cognizance of the differences rising upon excursions, the distribution of plunder, &c.

ADAM, the first of the human race, was formed by the Almighty on the sixth day of the creation. His body was made of the dust of the earth: after which, God animated or gave it life, and Adam then became a rational creature. His heavenly Parent did not leave his offspring in a destitute state to shift for himself; but planted a garden, in which he caused to grow not only every tree that was proper for producing food, but likewise such as were agreeable to the eye, or merely ornamental. In this garden were assembled all the brute creation; and, by their Maker, caused to pass before Adam, who gave all of them names, which were judged proper by the Deity himself.—In this review Adam found none for a companion to himself. This solitary state was seen by the Deity to be attended with some degree of unhappiness; and therefore he threw Adam into a deep sleep, in which condition he took a rib from his side, and healing up the wound formed a woman of the rib he had taken out. On Adam's awaking, the woman was brought to him; and he immediately knew her to be one of his own species, called her his bone and his flesh, giving her the name of *woman* because she was taken out of man.

The first pair being thus created, God gave them authority over the inferior creation, commanding them to subdue the earth, also to increase and multiply and fill it. They were informed of the proper food for the beasts and for them; the grass, or green herbs, being appointed for beasts; and fruits, or seeds, for man. Their proper employment also was assigned them; namely, *to dress the garden, and to keep it*.

Though Adam was thus highly favoured and instructed by his Maker, there was a single tree, which grew in

Adage
||
Adam.

Adam. in the middle of the garden, of the fruit of which they were not allowed to eat; being told, that they should surely die in the day they ate of it. This tree was name *the Tree of the Knowledge of Good and Evil*. This prohibition, however, they soon broke through. The woman having entered into conversation with *the Serpent*, was by him persuaded, that by eating of the tree she should become as wise as God himself; and accordingly, being invited by the beauty of the fruit, and its desirable property of imparting wisdom, she plucked and eat; giving her husband of it at the same time, who did likewise eat.

Before this transgression of the divine command, Adam and his wife had no occasion for clothes, neither had they any sense of shame; but immediately on eating the forbidden fruit, they were ashamed of being naked, and made aprons of fig leaves for themselves. On hearing the voice of God in the garden, they were terrified, and hid themselves: but being questioned by the Deity, they confessed what they had done, and received sentence accordingly; the man being condemned to labour; the woman to subjection to her husband, and to pain in child-bearing. They were now driven out of the garden, and their access to it prevented by a terrible apparition. They had clothes given them by the Deity made of the skins of beasts. In this state Adam had several children; the names of only three of whom we are acquainted with, viz. Cain, Abel, and Seth. He died at the age of 930 years.

These are all the particulars concerning Adam's life, that we have on divine authority: but a vast multitude of others are added by the Jews, Mahometans, and Papists; all of which must be at best conjectural; most of them, indeed, appear downright falsehoods or absurdities. The curiosity of our readers, it is presumed, will be sufficiently gratified by the few which are here subjoined.

According to the Talmudists, when Adam was created, his body was of immense magnitude. When he sinned, his stature was reduced to a hundred ells, according to some; to nine hundred cubits, according to others; who think this was done at the request of the angels, who were afraid of so gigantic a creature. In the island of Ceylon is a mountain, called the *Peak* or mountain of Adam, from its being, according to the tradition of the country, the residence of our first parents. Here the print of his footsteps, above two palms in length, are still pointed out.

Many reveries have been formed concerning the personal beauty of Adam. That he was a handsome well-shaped man is probable; but some writers, not content with this, affirm, that God, intending to create man, clothed Himself with a perfectly beautiful human body, making this his model in the formation of the body of Adam.

Nor has the imagination been less indulged concerning the formation of the human species male and female.—It would be endless to recount all the fancies that have been wrote on this subject; but as Madame Bourignon has made a considerable figure in the *religious*, or rather *superstitious*, world, we cannot help inserting some of her opinions concerning the first man, which are peculiarly marvellous. According to the *revelations* of this lady, Adam before his fall possessed in himself the principles of both sexes, and the virtue

or power of producing his like, without the concurrent assistance of woman. The division into two sexes, the imagined*, was a consequence of man's sin; and now, she observes, mankind are become so many *monsters in nature*, being much less perfect in this respect than plants or trees, which are capable of producing their like alone, and without pain or misery. She even imagined, that, being in an ecstacy, she saw the figure of Adam before he fell, with the manner how, by himself, he was capable of procreating other men. "God," says she, "represented to my mind the beauty of the first world, and the manner how he had drawn it from the chaos: every thing was bright, transparent, and darted forth life and ineffable glory. The body of Adam was purer and more transparent than crystal, and vastly fleet; through this body were seen vessels and rivulets of light, which penetrated from the inward to the outward parts, through all his pores. In some vessels ran fluids of all kinds and colours, vastly bright, and quite diaphanous. The most ravishing harmony arose from every motion; and nothing resisted, or could annoy him. His stature was taller than the present race of men; his hair was short, curled, and of a colour inclining to black; his upper lip covered with short hair: and instead of the bestial parts which modesty will not allow us to name, he was fashioned as our bodies will be in the life eternal, which I know not whether I dare reveal. In that *region* his nose was formed after the manner of a *face*, which diffused the most delicious fragrancy and perfumes; whence also men were to issue, all whose principles were inherent in him: there being in his belly a vessel, where little eggs were formed; and a second vessel filled with a fluid, which impregnated those eggs: and when man heated himself in the love of God, the desire he had that other creatures should exist besides himself, to praise and love God, caused the fluid above mentioned (by means of the fire of the love of God), to drop on one or more of these eggs, with inexpressible delight; which being thus impregnated, issued, some time after,

out of man, by this canal†, in the shape of an egg, whence a perfect man was hatched by insensible degrees. Woman was formed by taking out of Adam's sides the vessels that contained the eggs; which she still possesses, as is discovered by anatomists."

Many others have believed, that Adam at his first creation was both male and female: others, that he had two bodies joining together at the shoulders, and their faces looking opposite ways like those of Janus. Hence, say these, when God created Eve, he had no more to do than to separate the two bodies from one another †. Of all others, however, the opinion of † See An-Paracelsus seems the most ridiculous||. *Negabat primos dragyne- parentes ante lapsum habuisse partes generationi hominis necessarias; credebat postea accessisse, ut strumam gutturi.*

Extravagant things are asserted concerning Adam's knowledge. It is very probable that he was instructed by the Deity how to accomplish the work appointed him, viz. to dress the garden, and keep it from being destroyed by the brute creatures; and it is also probable that he had likewise every piece of knowledge communicated to him that was either necessary or pleasing: but that he was acquainted with geometry, mathematics, rhetoric, poetry, painting, sculpture, &c. is too ridiculous to be credited by any sober person. Some rabbies,

Adam.
* Preface to a book, entitled *Le nouveau ciel et la nouvelle terre*, Amst. 1779.

† i. e. the nasal canal, situated as above described.

|| See An-Paracelsus dragyne- parentes ante lapsum habuisse partes generationi hominis necessarias; credebat postea accessisse, ut strumam gutturi. V. cinum de Phlogistia, c. ix. p. 72.

Adam. rabbies, indeed, have contented themselves with equaling Adam's knowledge to that of Moses and Solomon; while others, again, have maintained that he excelled the angels themselves. Several Christians seem to be little behind these Jews in the degree of knowledge they ascribe to Adam; nothing being hid from him, according to them, except contingent events relating to futurity. One writer indeed (Pinedo) excepts politics; but a Carthusian friar, having exhaulted in favour of Aristotle, every image and comparison he could think of, at last asserted that Aristotle's knowledge was as extensive as that of Adam.—In consequence of this surprising knowledge with which Adam was endued, he is supposed to have been a considerable author. The Jews pretend that he wrote a book on the creation, and another on the Deity. Some rabbies ascribe the 92d psalm to Adam; and in some manuscripts the Chaldee title of this psalm expressly declares that this is the song of praise which the first man repeated for the Sabbath day.

Various conjectures have been formed concerning the place where man was first created, and where the garden of Eden was situated; but none of these have any solid foundation. The Jews tell us, that Eden was separated from the rest of the world by the ocean; and that Adam, being banished therefrom, walked across the sea, which he found every way fordable, by reason of his enormous stature*. The Arabians imagined paradise to have been in the air; and that our first parents were thrown down from it on their transgression, as Vulcan is said to have been thrown down headlong from heaven by Jupiter.

Strange stories are told concerning Adam's children. That he had none in the state of innocence, is certain from Scripture; but that his marriage with Eve was not consummated till after the fall, cannot be proved from thence. Some imagine, that, for many years after the fall, Adam denied himself the connubial joys by way of penance; others, that he cohabited with another woman, whose name was LILLITH. The Mahometans tell us, that our first parents having been thrown headlong from the celestial paradise, Adam fell upon the isle of Serendib, or Ceylon, in the East Indies; and Eve on Iodda, a port of the Red sea, not far from Mecca. After a separation of upwards of 200 years, they met in Ceylon, where they multiplied: according to some Eve had twenty, according to others only eight, deliveries; bringing forth at each time twins, a male and a female, who afterwards married. The rabbins imagine that Eve brought forth Cain and Abel at a birth; that Adam wept for Abel an hundred years in the valley of tears near Hebron, during which time he did not cohabit with his wife; and that this separation would probably have continued longer, had it not been forbid by the angel Gabriel. The inhabitants of Ceylon affirm, that the salt lake on the mountain of Colombo consists wholly of the tears which Eve for one hundred years together shed because of Abel's death.

Some of the Arabians tell us, that Adam was buried near Mecca on Mount Abukobeis; others, that Noah, having laid his body in the ark, caused it to be carried after the deluge to Jerusalem by Melchisedeck the son of Shem: of this opinion are the eastern Christians; but the Persians affirm that he was interred

in the isle of Serendib, where his corpse was guarded by lions at the time the giants warred upon one another. St Jerome imagined that Adam was buried at Hebron; others, on Mount Calvary. Some are of opinion that he died on the very spot where Jerusalem was afterwards built; and was buried on the place where Christ suffered, that so his bones might be sprinkled with the Saviour's blood.

Adam, *Melchior*, lived in the 17th century. He was born in the territory of Grotkaw in Silesia, and educated in the college of Brieg, where the dukes of that name, to the utmost of their power, encouraged learning and the reformed religion as professed by Calvin. Here he became a firm Protestant; and was enabled to pursue his studies by the liberality of a person of quality, who had left several exhibitions for young students. He was appointed rector of a college at Heidelberg, where he published his first volume of illustrious men in the year 1615. This volume, which consisted of philosophers, poets, writers on polite literature, and historians, &c. was followed by three others: that which treated of divines was printed in 1619; that of the lawyers came next; and, finally, that of the physicians: the two last were published in 1620. All the learned men, whose lives are contained in these four volumes, lived in the 16th, or beginning of the 17th century, and are either Germans or Flemings; but he published in 1618 the lives of twenty divines of other countries in a separate volume. All his divines are Protestants. The Lutherans were not pleased with him, for they thought him partial; and will not allow his work to be a proper standard of the learning of Germany. He was the author of several other works besides his lives. His industry as a biographer is commended by Bayle, who acknowledges his obligations to his labours. He died in 1622.

Adam, *Robert*, an eminent architect, was born at Edinburgh in the year 1728. He was the second son of William Adam, Esq. of Maryburgh, in the county of Fife, who has also left some respectable specimens of his genius and abilities as an architect in Hope-toun house, and the Royal Infirmary of Edinburgh, which were erected from designs executed by him. And it was perhaps owing to the fortunate circumstance of his father's example that young Adam first directed his attention to those studies, in the prosecution of which, he afterwards rose to such distinguished celebrity. He received his education at the university of Edinburgh, where he had an opportunity of improving and enlarging his mind, by the conversation and acquaintance of some of the first literary characters of the age who were then rising into reputation, or have since established their fame as historians and philosophers. Among these were Mr Hume, Dr Robertson, Dr Smith, and Dr Ferguson, who were the friends and companions of the father, and who continued through life their friendship and attachment to the son.

In the year 1754 Mr Adam travelled to the continent, with a view to extend his knowledge and improve his taste in architecture, and resided in Italy for three years. Here he surveyed and studied those noble specimens of ancient grandeur which the magnificent public edifices of the Romans, even in ruins, still exhibit. But he saw with regret, that the public buildings, constructed with more durable materials and greater

* This is just the picture of the Orion or Polyphemus of the poets.

Æneid. iii. 663, 664. x. 763.

Adam. greater strength and solidity, had alone been able to resist, during the lapse of ages, the injuries of time, and the more destructive hand of the northern barbarians, whose progress was marked with ruin and desolation. Not a vestige of any of the private buildings of the wealthy citizens, which have been described and celebrated by their writers for their magnificence, now remains; and even the situation of some of the splendid villas of the luxurious Romans is scarcely known. In tracing the progress of architecture and the other fine arts among the Romans, Mr Adam observed that they had visibly declined previous to the time of Dioclesian; but he was also convinced that the liberal patronage and munificence of that emperor had revived during his reign a better taste for architecture, and had formed artists who were capable of imitating the more elegant style of a purer age. He had seen this remarkably exemplified in the public baths at Rome, which were erected by him, the most entire and the noblest of the ancient buildings. Admiring the extent and fertility of genius of the artists, from whose designs such magnificent structures had been executed, he was anxious to see and study any remains that yet existed of those masters whose works are striking monuments of an elegant and improved taste, but whose names, amid the wrecks of time, have sunk into oblivion. It was with this view that he undertook a voyage to Spalatro, in Dalmatia, to visit and examine the private palace of Dioclesian, in which that emperor resided for nine years previous to his death, and to which he retired in the year 305, when he resigned the government of the empire. Mr Adam sailed from Venice in July 1754, accompanied by M. Clerisseau, a French artist and antiquarian, and two experienced draughtsmen. On their arrival at Spalatro, they found that though the palace had suffered much from the injuries of time, yet it had sustained not less from the dilapidations of the inhabitants to procure materials for building, and even the foundations of the ancient structure were covered with modern houses. With high expectations of success, they commenced their labours, but were soon interrupted by the jealous vigilance of the government. Suspecting that their object was to view and make plans of the fortifications, an immediate and peremptory order was issued by the governor, commanding them to desist. This order, however, was soon counteracted through the mediation of General Græme, the commander in chief of the Venetian forces; and they were permitted to proceed in their undertaking. They resumed their labours with double ardour, and in five weeks finished plans and views of the fragments which remain, from which they were enabled to execute perfect designs of the entire building.

Mr Adam now returned to England, and soon rose to very considerable professional eminence. In 1762 he was appointed architect to the king, and the year following he presented to the public the fruit of his voyage to Spalatro, in a splendid work dedicated to his majesty, which contains engravings and descriptions of the ruins of the palace. A later traveller, the Abbé Fortis, speaking of the ruins of this palace, says, "I will not pretend to mention the great Roman remains, for which this noble city is chiefly known and celebrated. The lovers of architecture and antiquity are sufficiently acquainted with them by the work of Mr

Adam, who has done full justice to these superb vestiges by his elegant drawings and engravings. In general, however, the coarseness of the work, and the bad taste of the age are equal to the magnificence of the buildings. For all this, I do not mean to detract from the merit of the august remains of Dioclesian's palace. I count them among the most respectable monuments of antiquity now extant." And the historian of the Decline and Fall of the Roman Empire, in consequence of this observation, after having expressed a high commendation of the work, has thrown out a suspicion of the accuracy of the representations and descriptions. "For the account of Dioclesian's palace, says Mr Gibbon, we are indebted to an ingenious artist of our own time and country, whom a very liberal curiosity had carried into the heart of Dalmatia. But there is room to suspect that the elegance of his designs and engravings has somewhat flattered the objects which it was their purpose to represent. We are informed by a more recent and very judicious traveller, that the awful ruins of Spalatro are not less expressive of the decline of the arts, than of the greatness of the Roman empire in the time of Dioclesian." Mr Gibbon's criticism is scarcely supported by the observation of the Abbé Fortis; and what the latter has advanced on this subject is not perfectly consistent with itself: for while he censures the coarseness of the work and the bad taste of the age, he bestows something like indirect praise, when he adds that, he means not to detract from the merit of the august remains of this edifice, and regards it as one of the most respectable monuments of antiquity now extant. The apparent coarseness of the work is probably owing to the effects of the weather, which have destroyed the smooth polish of the chisel which it originally received; and Mr Adam allows, that, previous to this period of the Roman empire, the arts had visibly declined, but at the same time contends, that the buildings erected in the reign of Dioclesian, exhibit convincing proofs of the style and manner of a purer age. But of this, the admirer of this elegant art may judge for himself, by consulting the engravings and descriptions, the accuracy and faithfulness of which there seems to be no reason to doubt.

In the year 1768 Mr Adam obtained a seat in parliament. He was chosen to represent the county of Kinross; and about the same time he resigned his office of architect to the king. But he continued his professional career with increasing reputation; and about the year 1773, in conjunction with his brother James, who also rose to considerable eminence as an architect, he published another splendid work, consisting of plans and elevations of public and private buildings which were erected from their designs. Among these are Lord Mansfield's house at Caenwood, Luton house in Bedfordshire belonging to Lord Bute, the new Gateway of the Admiralty Office, the Register Office at Edinburgh &c. which are universally admired as precious monuments of elegant design and correct taste. The Adelphi buildings at London, which are also striking examples of the inventive genius of the Messrs Adam, proved an unsuccessful speculation. The wealth and power of a nation were perhaps only equal to so extensive an undertaking: it was too great to be attempted by private citizens.

The buildings which have been more lately erected from

Adam. from the designs of Mr Adam, afford additional proofs of the unlimited extent of his invention, and the amazing fertility of his genius. Those parts of the new University of Edinburgh which have been completed, and the Infirmary at Glasgow, need only be mentioned in proof of our remark. The latter edifice we have often beheld and contemplated, with those feelings of admiration, elevated to a kind of rapturous enthusiasm, which the rare union of perfect symmetry and elegant disposition of parts combined with inexpressible beauty and lightness into one whole seldom fails to inspire. We have also seen and admired elegant designs executed by Mr Adam, which were intended for the South Bridge and South Bridge Street of Edinburgh, and if they had been adopted, would have added much to the decoration of that quarter of the town; but being considered unsuitable to the taste or economy of the times they were rejected.

Strange incongruities appear in buildings which have been erected from designs by Mr Adam. But of these it must be observed, that they have been altered and mutilated in the execution, according to the capricious fancy and vulgar taste of the owners; and it is well known that a slight deviation changes the character and mars the effect of the general design. A lady of rank was furnished by Mr Adam with a design of a house, which, after being executed, he was astonished to find out of all proportion. On inquiring the cause, he was informed that the pediment which he had designed would not admit a piece of rude sculpture which represented the arms of the family, and by the date which it bore incontestably proved its antiquity. It was therefore absolutely necessary to enlarge the dimensions of the pediment, to receive this ancient badge of family honour, and sacrifice the beauty and proportion of the whole building. We have seen a large public edifice which was also designed by Mr Adam; but when it was erected, the length was curtailed of the space of two windows, while the other parts remained according to the original plan. It now presents a heavy unsightly pile, instead of that elegance of proportion and correctness of style which the faithful execution of Mr Adam's design would have probably exhibited.

To the last period of his life, Mr Adam displayed an increasing vigour of genius and refinement of taste; for, in the space of one year preceding his death, he designed eight great public works, besides twenty-five private buildings, so various in their style, and beautiful in their composition, that they have been allowed, by the best judges, sufficient of themselves to establish his fame unrivalled as an artist. The present improved taste, which now pretty generally prevails in our public and private edifices, undoubtedly owes much to the elegant and correct style introduced by Mr Adam. His fertile genius was not confined merely to the external decoration of buildings; it displayed itself with equal effect in the internal arrangement and disposition of the apartments, and in the varied, elegant, and beautiful ornaments of chimney pieces and ceilings. But not only did he introduce a total change in the architecture of the country, the manufactures also which are in any way connected with decoration, experienced a considerable degree of improvement by the

exercise of his inventive powers. His talents extended beyond the line of his own profession; he displayed in his numerous drawings in landscape, a luxuriance of composition, and an effect of light and shadow which have rarely been equalled.

He died on the 3d of March 1792, by the bursting of a blood-vessel, in the 64th year of his age, and was buried in Westminster Abbey. His funeral was attended by a select number of friends, some of them of distinguished rank, who esteemed him while living, and who wished to express this last mark of regard. The many elegant buildings, public and private, erected in various parts of the kingdom, from the designs of Mr Adam, will remain lasting monuments of his taste and genius; and the natural suavity of his manners, joined to the excellence of his moral character, secured to him the affectionate regard of his friends, and the esteem of all who enjoyed his acquaintance.

James Adam, whom we have already mentioned as associated with his brother in many of his labours, died on the 20th October 1794.

ADAM'S Apple, a name given to a species of *CITRUS*. See *BOTANY Index*.

ADAM'S Bridge, or *Rama's Bridge*, in *Geography*, a ridge of sands and rocks, extending across the north end of Manara gulf, from the island of that name, on the north-west coast of Ceylon, to Ramencote or Ramankoil island, off Raman point.

ADAM'S Needle. See *YUCCA*, *BOTANY Index*.

ADAM'S Peak, a high mountain of the East Indies, in the island of Ceylon, on the top of which it is believed the first man was created. It is in the form of a sugar loaf, and terminates in a circular plain about 200 paces in diameter. The summit is covered with trees, and has a deep lake which supplies the principal rivers of the island. The mountain is seen at the distance of twenty leagues from sea. It is situated in N. Lat. 5. 55. E. Long. 80. 39. See *ADAM*.

ADAM, or *ADOM*, a town in the Peræa or on the other side the Jordan, over against Jericho, where the Jordan began to be dried up on the passage of the Israelites, (Joshua).

ADAMA, or *ADMAN*, one of the towns that were involved in the destruction of Sodom; (Moses).

ADAMANT, a name sometimes given to the diamond. (See *DIAMOND*). It is likewise applied to the scoriae of gold, the magnet, &c.

ADAMARA, in *Geography*, a district of Abyssinia, near the province of Waldubba, containing several considerable villages, that are inhabited by Mahometans; who by their number and strength contribute to the safety of the monks in that part of the country. It is so called from *Adama*, which in the Amharic dialect signifies *pleasant*, the name of an adjacent mountain. The river Anzo runs in a contiguous valley. (*Bruce's Travels*, vol. iii. p. 179.)

ADAMIC EARTH, a name given to common red clay, alluding to that species of earth of which the first man is supposed to have been made.

ADAMI POMUM, in *Anatomy*, a protuberance in the fore-part of the throat, formed by the os hyoides. It is thought to be so called upon a strange conceit, that a piece of the forbidden apple, which Adam ate, stuck by the way, and occasioned it.

ADAMITES,

Adamites
||
Adamson.

ADAMITES, or ADAMIANS, in *Ecclesiastical History*, the name of a sect of ancient heretics, supposed to have been a branch of the Basilidians and Carpocratians.

Epiphanius tells us, that they were called Adamites from their pretending to be re-established in the state of innocence, and to be such as Adam was at the moment of his creation, whence they ought to imitate him in his nakedness. They rejected marriage; maintaining, that the conjugal union would never have taken place upon earth had sin been unknown.

This obscure and ridiculous sect did not at first last long; but it was revived, with additional absurdities, in the twelfth century, by one Tandamus, since known by the name of *Tanchelin*, who propagated his errors at Antwerp, in the reign of the emperor Henry V. He maintained, that there ought to be no distinction between priests and laymen, and that fornication and adultery were meritorious actions. Tanchelin had a great number of followers, and was constantly attended by 3000 of these profligates in arms. His sect did not, however, continue long after his death; but another appeared under the name of *Turkupins*, in Savoy and Dauphiny, where they committed the most brutal actions in open day.

About the beginning of the fifteenth century, one Picard, a native of Flanders, spread these errors in Germany and Bohemia, particularly in the army of the famous Zisca, notwithstanding the severe discipline he maintained. Picard pretended that he was sent into the world as a new Adam, to re-establish the law of nature; and which, according to him, consisted in exposing every part of the body, and having all the women in common. This sect found also some partizans in Poland, Holland, and England: they assembled in the night; and it is asserted, that one of the fundamental maxims of their society was contained in the following verse:

Jura, perjura, secretum prodere noli.

ADAMS, in *Geography*, a township of Berkshire county, in the state of Massachusetts in North America. It is 140 miles north-west of Boston, and contains 2040 inhabitants. In the northern part of this district, a stream called Hudson's brook, has worn a channel through a stratum of white marble, and over the channel the rocks form a fine natural bridge which is 12 or 15 feet long, 10 feet broad, and more than 60 feet above the water.

ADAMSHIDE, a district of the circle of Rastenburg, belonging to the king of Prussia, which, with Dombrosken, was bought, in 1737, for 42,000 dollars.

ADAMSON, PATRICK, a Scottish prelate, archbishop of St Andrew's, was born in the year 1543 in the town of Perth, where he received the rudiments of his education; and afterwards studied philosophy, and took his degree of master of arts at the university of St Andrew's. In the year 1566, he set out for Paris, as tutor to a young gentleman. In the month of June of the same year, Mary queen of Scots being delivered of a son, afterwards James VI. of Scotland and I. of England, Mr Adamson wrote a Latin poem on the occasion. In this poem he gave the prince the titles of king of France and England, and this proof of his loyalty involved him in difficulties; for the

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French court was offended, and ordered him to be arrested; and he was confined for six months. He was released only through the intercession of Queen Mary, and some of the principal nobility, who interested themselves in his behalf. As soon as he recovered his liberty, he retired with his pupil to Bourges. He was in this city during the massacre at Paris; and the same persecuting spirit prevailing among the Catholics at Bourges as at the metropolis, he lived concealed for seven months in a public house, the master of which, upwards of 70 years of age, was thrown from the top thereof, and had his brains dashed out, for his charity to heretics. Whilst Mr Adamson lay thus in his sepulchre, as he called it, he wrote his Latin poetical version of the book of Job, and his Tragedy of Herod in the same language. In the year 1573, he returned to Scotland; and, having entered into holy orders, became minister of Paisley. In the year 1575, he was appointed one of the commissioners, by the general assembly, to settle the jurisdiction and policy of the church; and the following year he was named, with Mr David Lindsay, to report their proceedings to the earl of Morton, then regent. About this time the earl appointed him one of his chaplains; and, on the death of Bishop Douglas, promoted him to the archiepiscopal see of St Andrew's, a dignity which brought upon him great trouble and uneasiness: for now the clamour of the Presbyterian party rose very high against him, and many inconsistent absurd stories were propagated concerning him. Soon after his promotion, he published his catechism in Latin verse, a work highly approved even by his enemies; but, nevertheless, they still continued to persecute him with great violence. In 1578, he submitted himself to the general assembly, which procured him peace but for a very little time; for the year following, fresh accusations were brought against him. In the year 1582, being attacked with a grievous disease, in which the physicians could give him no relief, he happened to take a simple medicine from an old woman, which did him service. The woman whose name was Alison Pearson, was thereupon charged with witchcraft, and committed to prison, but escaped out of her confinement; however, about four years afterwards, she was again found and burnt for a witch. In 1583, King James came to St Andrews; and the archbishop, being much recovered, preached before him, and disputed with Mr Andrew Melvil, in presence of his majesty, with great reputation; which drew upon him fresh calumny and persecution. The king, however, was so well pleased with him, that he sent him ambassador to Queen Elizabeth, at whose court he resided for some years. His conduct, during his embassy, has been variously reported by different authors. Two things he principally laboured, viz. the recommending the king his master to the nobility and gentry of England, and the procuring some support for the episcopal party in Scotland. His eloquent preaching drew after him such crowds of people, and raised in their minds such a high idea of the young king his master, that Queen Elizabeth forbade him to enter the pulpit during his stay in her dominions. In 1584, he was recalled, and sat in the parliament held in August at Edinburgh. The Presbyterian party was still very violent against the archbishop. A provincial synod was held at St Andrew's in April 1586: the arch-

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bishop

Adamson ||
 Adanson. } bishop was here accused and excommunicated: he appealed to the king and the states, but this availed him little; for the mob being excited against him, he durst scarce appear in public. At the next general assembly, a paper being produced, containing the archbishop's submission, he was absolved from the excommunication. In 1588, fresh accusations were brought against him. The year following, he published the Lamentations of the prophet Jeremiah in Latin verse; which he dedicated to the king, complaining of his hard usage. In the latter end of the same year, he published a translation of the Apocalypse, in Latin verse; and a copy of Latin verses, addressed also to his majesty, deploring his distress. The king, however, was not moved by his application; for the revenue of his see was granted to the duke of Lennox; so that the prelate and his family were literally reduced to the want of bread. During the remaining part of his unfortunate life he was supported by charitable contribution, and he died in 1591. The character of this prelate has been variously represented, according to the sentiments of religion and politics which prevailed. But there is little doubt that he encouraged and supported, under the authority of the king, oppressive and injurious measures. Bigotted and timid, he wanted that firmness and intrepidity, which promise steadiness and uniformity of conduct in the conspicuous characters of turbulent times. His learning was unquestioned; and he acquired great reputation as a popular preacher. In his adversity he submitted with pious resignation to his hard fate. The panegyric of the editor of his works, Mr Wilson, is extravagant and absurd. He says, that "he was a miracle of nature, and rather seemed to be the immediate production of God Almighty, than born of a woman."

ADAMUS, the philosopher's stone is so called by alchemists; they say it is an animal, and that it has carried its invisible *Eve* in its body, since the moment they were united by the Creator.

ADANA, in *Geography*, a town of Asia Minor, in Natolia, and in the province of Caramania. It is situated on the river Choquen; on the banks of which stands a small but strong castle built on a rock. It has a great number of beautiful fountains brought from the river by means of water-works. Over the river there is a stately bridge of fifteen arches, which leads to the water-works. The climate is pleasant and healthy, and the winter mild and serene: but the summer is so hot as to oblige the principal inhabitants to retire into the neighbouring mountains, where they spend six months among shady trees and grottoes, in a most delicious manner. The adjacent country is rich and fertile, and produces melons, cucumbers, pomegranates, pulse, and herbs of all sorts, all the year round; besides corn, wine, and fruits in their proper season. It is 30 miles north-east of Tarsus, on the road to Aleppo. E. Long. 36. 12. N. Lat. 38. 10.

ADANSON, MICHAEL, a celebrated naturalist, was born at Aix in Provence in the year 1727. He was sent to Paris in early life, and devoted his studies with great assiduity to medicine, botany, and astronomy, and was a pupil of the celebrated Reaumur. He went to Senegal in the year 1738, where he remained six years examining the natural productions of that country. He presented the fruits of his discove-

ries in geography and natural history to the Royal Academy; and in consequence of these communications he was appointed one of their corresponding members. In the year 1759, on the death of Reaumur he was elected a member in his place; and about the same time he was admitted an honorary member of the Royal Society of London. Having spent six years in Senegal, he returned to Paris, where he published a work entitled, *Histoire Naturelle du Senegal*, in 4to; and in 1763 his *Familles des Plantes*, 2 vols 8vo. In the year 1775 he presented to the academy the plan of a natural history, which he did not live to execute. He died soon after; but the time of his death is not exactly known.

ADANSONIA, ETHIOPIAN SOUR-GOURD, MONKIES BREAD, or AFRICAN CALABASH TREE. See BOTANY *Index*.

ADAR, the name of a Hebrew month, answering to the end of February and beginning of March, the 12th of their sacred, and 6th of their civil year. On the 7th day of it, the Jews keep a fast for the death of Moses; on the 13th, they have the feast of Esther: and on the 14th, they celebrate the feast of Purim, for their deliverance from Haman's conspiracy. As the lunar year, which the Jews followed in their calculations, is shorter than the solar by about 11 days, which at the end of three years make a month, they then intercalate a 13th month, which they call *Veadar*, or the *second Adar*.

ADARCE, a kind of concreted salts found on reeds and other vegetables, and applied by the ancients as a remedy in several cutaneous diseases.

ADARCON, in Jewish *Antiquity*, a gold coin mentioned in Scripture, worth about 15s. sterling.

ADARME, in *Commerce*, a small weight in Spain, which is also used at Buenos Ayres, and in all Spanish America. It is the 16th part of an ounce, which at Paris is called the *demi-gros*. But the Spanish ounce is seven *per cent*. lighter than that of Paris, Stephens renders it in English by a *drachm*.

ADATAIS, ADATSI, or ADATYS, in *Commerce*, a muslin or cotton cloth, very fine and clear, of which the piece is ten French ells long, and three quarters broad. It comes from the East Indies; and the finest is made in Bengal.

ADCORDABILIS DENARII, in old law books, signify money paid by the vassal to his lord, upon the selling or exchanging of a feud.

ADCRESCENTES, among the *Romans*, denoted a kind of soldiery, entered in the army, but not yet put on duty; from these the standing forces were recruited. See ACCENSI.

ADDA, in *Geography*, a river of Switzerland and Italy, which rises in Mount Branlio, in the country of the Grisons, and, passing through the Valteline, traverses the lake Como and the Milanese, and falls into the Po, near Cremona.

ADDEPHAGIA, in *Medicine*, a term used by some physicians, for gluttony, or a voracious appetite.

ADDER, in *Zoology*, a name for the VIPER. See COLUBER.

ADDER Bolts, or Adder flies. See LIBELLULA.

Sea ADDER, the English name of a species of SYN- GNATHUS.

Water ADDER, a name given to the COLUBER *Natrix*.
 ADDER-

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Adder
Addison.

ADDER-stung, is used in respect of cattle, when stung by any kind of venomous reptiles, as adders, scorpions, &c. or bit by a hedgehog or shrew.—For the cure of such bites, some use an ointment made of dragon's blood, with a little barley meal, and the whites of eggs.

ADDER-Wort, or *Snakeweed*. See POLYGONUM.

ADDEXTRATORES, in the court of Rome, the pope's mitre-bearers, so called, according to Ducange, because they walk at the pope's right hand when he rides to visit the churches.

ADDICE, or **ADZE**, a kind of crooked axe used by shipwrights, carpenters, coopers, &c.

ADDICTI, in *Antiquity*, a kind of slaves, among the Romans, adjudged to serve some creditor whom they could not otherwise satisfy, and whose slaves they became till they could pay or work out the debt.

ADDICTION, among the Romans, was the making over goods to another, either by sale, or by legal sentence; the goods so delivered were called *bona addicta*. Debtors were sometimes delivered over in the same manner; and thence called *servi addicti*.

ADDICTIO IN DIEM, among the Romans, the adjudging a thing to a person for a certain price, unless by such a day the owner, or some other, give more for it.

ADDISON, **LANCELOT**, son of Lancelot Addison a clergyman, was born in the parish of Crosby-Ravenf-worth in Westmorland, in the year 1632. He was educated at Queen's College, Oxford; and at the restoration of King Charles II. accepted of the chaplainship of the garrison of Dunkirk; but that fortress being delivered up to the French in 1662, he returned to England, and was soon after made chaplain to the garrison of Tangier; where he continued seven years, and was greatly esteemed. In 1670, he returned to England, and was made chaplain in ordinary to the king; but his chaplainship of Tangier being taken from him on account of his absence, he found himself straitened in his circumstances, when he reasonably obtained the rectory of Milston in Wiltshire, worth about 120*l. per annum*. He afterwards became a prebendary of Sarum; took his degree of doctor of divinity at Oxford; and in 1683 was made dean of Litchfield, and the next year archdeacon of Coventry. His life was exemplary; his conversation pleasing, and greatly instructive; and his behaviour as a gentleman, a clergyman, and a neighbour, did honour to the place of his residence. He wrote, 1. A Short Narrative of the Revolutions of the Kingdoms of Fez and Morocco: 2. The present history of the Jews: 3. A Discourse on Catechising: 4. A Modest Plea for the Clergy: 5. An Introduction to the Sacrament: 6. The first State of Mahometism: and several other pieces. This worthy divine died on the 20th of April 1703, and left three sons: Joseph, the subject of the next article; Gullston, who died while governor of Fort St George; Lancelot, master of arts, and fellow of Magdalen college in Oxford; and one daughter, first married to Dr Sarte prebendary of Westminster, and afterwards to Daniel Combes, Esq.

ADDISON, *Joseph*, the son of the preceding Dean Addison was born at Milston, near Ambresbury, in Wiltshire, on the 11th of May 1672; and not being thought likely to live, was baptized the same day. He

received the first rudiments of his education at the place of his nativity, under the reverend Mr Naish; but was soon removed to Salisbury, under the care of Mr Taylor; and from thence to the Charter-house, where his acquaintance with Sir Richard Steele commenced. About the age of fifteen, he was entered at Queen's college, Oxford, where he applied very closely to the study of classical learning, in which he made a surprising proficiency.

In the year 1687, Dr Lancaster, dean of Magdalen college, having, by chance, seen a Latin poem of Mr Addison's, was so pleased with it, that he immediately got him elected into that house, where he took up his degrees of bachelor and master of arts. His Latin pieces in the course of a few years, were exceedingly admired in both universities; nor were they less esteemed abroad, particularly by the celebrated Boileau, who is reported to have said, that he would not have written against Perrault, had he before seen such excellent pieces by a modern hand. He published nothing in English before the twenty-second year of his age; when there appeared a short copy of verses written by him, and addressed to Mr Dryden, which procured him great reputation from the best judges. This was soon followed by a translation of the Fourth Georgic of Virgil, (omitting the story of Aristæus), much commended by Mr Dryden. He wrote also the Essay on the Georgics, prefixed to Mr Dryden's translation. There are several other pieces written by him about this time; amongst the rest, one dated the 3d of April 1694, addressed to H. S. that is, Dr Sacheverel, who became afterwards so famous, and with whom Mr Addison lived once in the greatest friendship; but their intimacy was some time after broken off by their disagreement in political principles. In the year 1695, he wrote a poem to King William on one of his campaigns, addressed to Sir John Somers lord keeper of the great seal. This gentleman received it with great pleasure, took the author into the number of his friends, and bestowed on him many marks of his favour.

Mr Addison had been closely pressed, while at the university, to enter into holy orders; and had once resolved upon it: but his great modesty, his natural diffidence, and an uncommonly delicate sense of the importance of the sacred function, made him afterwards alter his resolution; and having expressed an inclination to travel, he was encouraged thereto by his patron above mentioned, who by his interest procured him from the crown a pension of 300*l. per annum* to support him in his travels. He accordingly made a tour to Italy in the year 1699; and, in 1701, he wrote a poetical epistle from Italy to the earl of Halifax, which has been universally esteemed as a most excellent performance. It was translated into Italian verse by the abbot Antonio Maria Salvini, Greek professor at Florence. In the year 1705, he published an account of his travels, dedicated to Lord Somers; which, though at first but indifferently received, yet in a little time met with its deserved applause.

In the year 1702, he was about to return to England, when he received advice of his being appointed to attend Prince Eugene, who then commanded for the emperor in Italy; but the death of King William happening soon after, put an end to this affair as well as his pension; and he remained for a considerable time un-

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employed. But an unexpected incident at once raised him, and gave him an opportunity of exerting his fine talents to advantage: for in the year 1704, the lord treasurer Godolphin happened to complain to Lord Halifax, that the duke of Marlborough's victory at Blenheim had not been celebrated in verse in the manner it deserved; and intimated, that he would take it kindly, if his lordship, who was the known patron of the poets, would name a gentleman capable of doing justice to so elevated a subject. Lord Halifax replied, somewhat hastily, that he did not know such a person, but would not mention him; adding, that long had he seen, with indignation, men of no merit maintained in luxury at the public expence, whilst those of real worth and modesty were suffered to languish in obscurity. The treasurer answered very coolly, that he was sorry there should be occasion for such an observation, but that he would do his endeavour to wipe off such reproaches for the future; and he engaged his honour, that whoever his lordship named, as a person capable of celebrating this victory, should meet with a suitable recompense. Lord Halifax thereupon named Mr Addison; insinuating, however, that the treasurer himself should send to him; which he promised. Accordingly he prevailed on Mr Boyle (afterwards Lord Carlton) then chancellor of the exchequer, to make the proposal to Mr Addison; which he did in so polite a manner, that our author readily undertook the task. The lord-treasurer had a sight of the piece, when it was carried no farther than the celebrated smile of the angel; and was so pleased with it, that he immediately appointed Mr Addison a commissioner of appeals, vacant by the promotion of Mr Locke, chosen one of the lords commissioners for trade. The Campaign is addressed to the duke of Marlborough; it gives a short view of the military transactions in 1704, and contains a noble description of the two great actions at Schellemburg and Blenheim. In 1705, he attended Lord Halifax to Hanover; and the ensuing year was appointed under secretary to Sir Charles Hedges secretary of state; in which office he acquitted himself so well, that the earl of Sunderland, who succeeded Sir Charles in December, continued Mr Addison in his employment.

A taste for operas beginning at this time to prevail in England, and many persons having solicited Mr Addison to write one, he complied with their request, and composed his *Rosamond*. This, however, whether from the defect of the music, or from the prejudices in favour of the Italian taste, did not succeed upon the stage; but the poetry of it has been, and always will be, justly admired. About this time, Sir Richard Steele composed his comedy of the *Tender Husband*, to which Mr Addison wrote a prologue. Sir Richard surprised him with a dedication of this play, and acquainted the public, that he was indebted to him for some of the most excellent strokes in the performance. The marquis of Wharton, being appointed lord lieutenant of Ireland in 1709, took Mr Addison with him as his secretary. Her majesty also made him keeper of the records of Ireland, and, as a farther mark of her favour, considerably augmented the salary annexed to that place. Whilst he was in this kingdom, the *Tatler* was first published; and he discovered his friend Sir Richard Steele to be the author, by an observation on *Virgil*, which he had communicated to him. He

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afterwards assisted considerably in carrying on this paper, which the author acknowledges. The *Tatler* being laid down, the *Spectator* was set on foot, and Mr Addison furnished great part of the most admired papers. The *Spectator* made its first appearance in March 1711, and was brought to a conclusion in September 1712.

His celebrated *Cato* appeared in 1713. He formed the design of a tragedy upon this subject when he was very young, and wrote it when on his travels: he retouched it in England, without any intention of bringing it on the stage; but his friends being persuaded it would serve the cause of liberty, he was prevailed on by their solicitations, and it was accordingly exhibited on the theatre, with a prologue by Mr Pope, and an epilogue by Dr Garth. It was received with the most uncommon applause, having run thirty-five nights without interruption. The Whigs applauded every line in which liberty was mentioned, as a satire on the Tories; and the Tories echoed every clap, to show that the satire was unfeint. When it was printed, notice was given that the queen would be pleased if it was dedicated to her; "but as he had designed that compliment elsewhere, he found himself obliged," says Tickell, "by his duty on the one hand, and his honour on the other, to send it into the world without any dedication." It was no less esteemed abroad, having been translated into French, Italian, and German; and it was acted at Leghorn, and several other places, with vast applause. The Jesuits of St Omers made a Latin version of it, and the students acted it with great magnificence.

About this time, another paper called the *Guardian* was published by Steele, to which Addison was a principal contributor. It was a continuation of the *Spectator*, and was distinguished by the same elegance and the same variety; but, in consequence of Steele's propensity to politics, was abruptly discontinued in order to write the *Englishman*.

The papers of Addison are marked in the *Spectator* by one of the letters in the name of *Clio*, and in the *Guardian* by a *Hand*. Many of these papers were written with powers truly comic, with nice discrimination of characters, and accurate observation of natural or accidental deviations from propriety: but it was not supposed that he had tried a comedy on the stage, till Steele, after his death, declared him the author of "*The Drummer*." This, however, he did not know to be true by any cogent testimony: for when Addison put the play into his hands, he only told him it was the work of a gentleman in the company; and when it was received, as is confessed, with cold disapprobation, he was probably less willing to claim it. Tickell omitted it in his collection; but the testimony of Steele, and the total silence of any other claimant, has determined the public to assign it to Addison, and it is now printed with his other poetry. Steele carried "*The Drummer*" to the playhouse, and afterwards to the press, and sold the copy for 50 guineas. To Steele's opinion may be added the proof supplied by the play itself, of which the characters are such as Addison would have delineated, and the tendency such as Addison would have promoted.

It is said that Mr Addison intended to have composed an English dictionary upon the plan of the Italian

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Addison. (Della Crusca); but, upon the death of the queen, being appointed secretary to the lords justices, he had not leisure to carry on such a work. When the earl of Sunderland was appointed lord lieutenant of Ireland, Mr Addison was again made secretary for the affairs of that kingdom; and, upon the earl's being removed from the lieutenancy, he was chosen one of the lords of trade.

Not long afterwards an attempt was made to revive the Spectator, at a time indeed by no means favourable to literature, when the succession of a new family to the throne filled the nation with anxiety, discord, and confusion; and either the turbulence of the times or the satiety of the readers put a stop to the publication, after an experiment of 80 numbers, which were afterwards collected into an eighth volume, perhaps more valuable than any of those that went before it: Addison produced more than a fourth part.

In 1715, he began the Freeholder, a political paper, which was much admired, and proved of great use at that juncture. He published also, about this time, verses to Sir Godfrey Kneller upon the king's picture, and some to the princess of Wales with the tragedy of Cato.

Before the arrival of King George he was made secretary to the regency, and was required by his office to send notice to Hanover that the queen was dead, and that the throne was vacant. To do this would not have been difficult to any man but Addison, who was so overwhelmed with the greatness of the event, and so distracted by choice of expression, that the lords, who could not wait for the niceties of criticism, called Mr Southwell, a clerk in the house, and ordered him to despatch the message. Southwell readily told what was necessary, in the common style of business, and valued himself upon having done what was too hard for Addison.

In 1716, he married the countess dowager of Warwick, whom he had solicited by a very long and anxious courtship. He is said to have first known her by becoming tutor to her son. The marriage, if uncontradicted report can be credited, made no addition to his happiness; it neither found them nor made them equal. She always remembered her own rank, and thought herself entitled to treat with very little ceremony the tutor of her son. It is certain that Addison has left behind him no encouragement for ambitious love. The year after, 1717, he rose to his highest elevation, being made secretary of state; but is represented as having proved unequal to the duties of his place. In the house of commons he could not speak, and therefore was useless to the defence of the government. In the office he could not issue an order without losing his time in quest of fine expressions. At last, finding by experience his own inability for public business, he was forced to solicit his dismissal, with a pension of 1500*l.* a-year. Such was the account of those who were inclined to detract from his abilities; but by others his relinquishment was attributed to declining health, and the necessity of recess and quiet.

In his retirement, he applied himself to a religious work*, which he had begun long before; part of which, scarce finished, has been printed in his works. He intended also to have given an English paraphrase of some of David's psalms. But his ailments increased,

* *Evidences of the Christian Religion.*

and cut short his designs. He had for some time been oppressed by an asthmatic disorder, which was now aggravated by a dropsy, and he prepared to die conformably to his precepts and professions. He sent, as Pope relates, a message by the earl of Warwick to Mr Gay, desiring to see him: Gay, who had not visited him for some time before, obeyed the summons, and found himself received with great kindness. The purpose for which the interview had been solicited was then discovered: Addison told him, that he had injured him; but that, if he recovered, he would recompense him. What the injury was he did not explain, nor did Gay ever know: but supposed that some preferment designed for him had by Addison's intervention been withheld.—Another deathbed interview, of a more solemn nature, is recorded: Lord Warwick was a young man of very irregular life, and perhaps of loose opinions. Addison, for whom he did not want respect, had very diligently endeavoured to reclaim him; but his arguments and exhortations had no effect: One experiment, however, remained to be tried. When he found his life near its end, he directed the young lord to be called: and when he desired, with great tenderness, to hear his last injunctions, told him, "I have sent for you that you may see how a Christian can die." What effect this awful scene had on the earl's behaviour is not known: he died himself in a short time. Having given directions to Mr Tickell for the publication of his works, and dedicated them on his deathbed to his friend Mr Craggs, he died June 17. 1719, at Holland-house, leaving only one child, a daughter, by his marriage.

Addison's course of life before his marriage has been detailed by Pope. He had in the house with him Budgell, and perhaps Philips. His chief companions were Steele, Budgell, Philips, Carey, Davenant, and Colonel Brett. With one or other of these he always breakfasted. He studied all morning; then dined at a tavern, and went afterwards to Button's. From the coffeehouse he went again to the tavern, where he often sat late, and drank too much wine.

Dr Johnson, in delineating the character of Addison, observes with Tickell, that he employed wit on the side of virtue and religion. He not only made the proper use of wit himself, but taught it to others; and from his time it has been generally subservient to the cause of reason and truth. He has dissipated the prejudice that had long connected gaiety with vice, and easiness of manners with laxity of principles. He has restored virtue to its dignity, and taught innocence not to be ashamed. This is an elevation of literary character, "above all Greek, above all Roman fame." No greater felicity can genius attain than that of having purified intellectual pleasure, separated mirth from indecency, and wit from licentiousness; of having taught a succession of writers to bring elegance and gaiety to the aid of goodness; and, to use expressions yet more awful, of having "turned many to righteousness." As a describer of life and manners, he must be allowed to stand perhaps the first of the first rank. His humour, which, as Steele observes, is peculiar to himself, is so happily diffused as to give the grace of novelty to domestic scenes and daily occurrences. He never "outsteps the modesty of nature," nor raises merriment or wonder by the violation of truth.

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truth. His figures neither divert by distortion, nor amaze by aggravation. He copies life with so much fidelity, that he can hardly be said to invent; yet his exhibitions have an air so much original, that it is difficult to suppose them not merely the product of imagination. As a teacher of wisdom he may be confidently followed. His religion has nothing in it enthusiastic or superstitious; he appears neither weakly credulous nor wantonly sceptical; his morality is neither dangerously lax nor impracticably rigid. All the enchantment of fancy and all the cogency of argument are employed to recommend to the reader his real interest, the care of pleasing the Author of his being. Truth is shown sometimes as the phantom of a vision, sometimes appears half-veiled in an allegory; sometimes attracts regard in the robes of fancy, and sometimes steps forth in the confidence of reason. She wears a thousand dresses, and in all is pleasing.

The Doctor, however, has related the following anecdote, which every admirer of Addison, every man of feeling, must be reluctant to believe. "Steele (says the Doctor), whose imprudence of generosity, or vanity of profusion, kept him always incurably necessitous, upon some pressing exigence, in an evil hour, borrowed a hundred pounds of his friend, probably without much purpose of repayment; but Addison, who seems to have had other notions of a hundred pounds, grew impatient of delay, and reclaimed his loan by an execution. Steele felt, with great sensibility, the obduracy of his creditor; but with emotions of sorrow rather than of anger." It is much to be wished, says Dr Kippis, that Dr Johnson had produced his authority for this narration. It is very possible, that it may be only a story the Doctor had somewhere heard in conversation, and which is entirely groundless: "and this I am the rather inclined to believe, as I have been assured, by one of the most respectable characters in the kingdom, that the fact hath no foundation in truth." Mr Potter, in a late publication, hath informed us, that he is told by the best authority, that the story is an absolute falsehood.

Mr Tyers, in "A Historical Essay on Mr Addison," printed, but not published, has mentioned some facts concerning him, with which we were not before acquainted. These are, That he was laid out for dead as soon as he was born: that, when he addressed his verses on the English poets to Henry Sacheverell, he courted that gentleman's sister: that, whenever Jacob Tonson came to him for the Spectator, Bayle's French Historical and Critical Dictionary lay always open before him: that, upon his return to England, after his travels, he discharged some old debts he had contracted at Oxford, with the generosity of good interest: that he was put into plentiful circumstances by the death of a brother in the East Indies: that, having received encouragement from a married lady, of whom he had been formerly enamoured, he had the integrity to resist the temptation: that he refused a gratification of a three hundred pounds bank-note, and afterwards of a diamond-ring of the same value, from a Major Dunbar, whom he had endeavoured to serve in Ireland by his interest with Lord Sunderland: and that his daughter by Lady Warwick died a few years ago unmarried, residing at Bilton near Rugby, and

possessing an income of more than twelve hundred a-year.

Addition.

The following letter, which probably relates to the case of Major Dunbar, reflects great honour on Mr Addison's integrity. "June 26. 1715. SIR, I find there is a very strong opposition formed against you; but I shall wait on my lord lieutenant this morning, and lay your case before him as advantageously as I can, if he is not engaged in other company. I am afraid what you say of his grace does not portend you any good. And now, Sir, believe me, when I assure you I never did, nor ever will, on any pretence whatsoever, take more than the stated and customary fees of my office. I might keep the contrary practice concealed from the world, were I capable of it, but I could not from myself; and I hope I shall always fear the reproaches of my own heart more than those of all mankind. In the mean time, if I can serve a gentleman of merit, and such a character as you bear in the world, the satisfaction I meet with on such an occasion is always a sufficient, and the only reward to Sir, your most obedient, humble servant, J. ADDISON."—The anecdote which follows was told by the late Dr Birch. Addison and Mr Temple Stanyan were very intimate. In the familiar conversations which passed between them, they were accustomed freely to dispute each other's opinions. Upon some occasion, Mr Addison lent Stanyan five hundred pounds. After this, Mr Stanyan behaved with a timid reserve, deference, and respect; not conversing with the same freedom as formerly, or canvassing his friend's sentiments. This gave great uneasiness to Mr Addison. One day they happened to fall upon a subject, on which Mr Stanyan had always been used strenuously to oppose his opinion. But, even upon this occasion, he gave way to what his friend advanced, without interposing his own view of the matter. This hurt Mr Addison so much, that he said to Mr Stanyan, "Either contradict me, or pay me the money."

In Tickell's edition of Mr Addison's works there are several pieces hitherto unmentioned, viz. The Dissertation on Medals; which, though not published till after his death, yet he had collected the materials, and began to put them in order, at Vienna, in 1702. A pamphlet, entitled, The present State of the War, and the Necessity of an Augmentation, considered. The late Trial and Conviction of Count Tariff. The Whig Examiner came out on the 14th of September 1716; there were five of these papers attributed to Mr Addison, and they are the severest pieces he ever wrote. He is said also to have been the author of a performance entitled *Dissertatio de insignioribus Romanorum Poetis*, and of a Discourse on Ancient and Modern Learning.

ADDITION, something added to another. Thus physicians call the ingredients added to a medicine already compounded, *addiamenta*.

ADDITION, is the joining together or uniting two or more things, or augmenting a thing by the accession of others thereto.

ADDITION, in *Arithmetic*, *Algebra*, &c. See these articles.

ADDITION, in *Music*, a dot marked on the right side of a note, signifying that it is to be sounded or lengthened

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ened half as much more as it would have been without such mark.

ADDITION, in *Law*, is that name or title which is given to a man over and above his proper name and surname, to show of what estate, degree, or mystery he is; and of what town, village, or country.

ADDITIONS of Estate, or Quality, are, Yeoman, Gentleman, Esquire, and such like.

ADDITIONS of Degree, are those we call names of dignity; as Knight, Lord, Earl, Marquis, and Duke.

ADDITIONS of Mystery, are such as Scrivener, Painter, Mason, and the like.

ADDITIONS of Place, are, of Thorp, of Dale, of Woodstock.—Where a man hath household in two places, he shall be said to dwell in both; so that his addition in either may suffice. Knave was anciently a regular addition. By stat. 1. Hen V. cap. 5. it was ordained, that in such suits or actions where process of outlawry lies, such addition should be made to the name of the defendant, to show his estate, mystery, and place where he dwells; and that the writs not having such additions should abate if the defendant take exception thereto; but not by the office of the court. The reason of this ordinance was, that one man might not be troubled by the outlawry of another; but by reason of the certain addition, every person might bear his own burden.

ADDITIONS, in *Distilling*, a name given to such things as are added to the wash, or liquor, while in a state of fermentation, in order to improve the vinosity of the spirit, procure a larger quantity of it, or give it a particular flavour. All things, of whatever kind, thus added in the time of fermentation, are called by those of the business who speak most intelligently *additions*; but many confound them with things of a very different nature, under the name of *ferments*. See **DISTILLING**.

ADDITIONS, in *Heraldry*, some things added to a coat of arms, as marks of honour; and therefore directly opposite to abatements. Among additions we reckon **BORDURE**, **QUARTER**, **CANTON**, **GYRON**, **PILE**, &c. See these articles.

ADDRESS, in a general sense, is used for skill and good management, and of late has been adopted from the French. It is used also in commerce, as synonymous with direction to a person or place. The word is formed of the French verb, *adresser*, *To direct any thing to a person*.

ADDUCENT MUSCLES, or **ADDUCTORS**, in *Anatomy*, those muscles which pull one part of the body towards another. See **ANATOMY**, *Table of the Muscles*.

ADEB, in *Commerce*, the name of a large Egyptian weight, used principally for rice, and consisting of 210 okes, each of three rotols, a weight of about two drams less than an English pound. But this is no certain weight; for at Rosetto the adeb is only 150 okes.

ADEL, a kingdom on the eastern coast of Africa, which reaches as far as the straits of Babelmandel, which unite the Red sea to the sea of Arabia. This country produces corn, and feeds a great number of cattle. The inhabitants carry on a trade in gold, silver, ivory, oil, frankincense, a sort of pepper, and other merchandises of Arabia and the Indies. The king was formerly a vassal to the grand negus of Abyssinia: but being Mahometans, and the Abyssinians a sort of Chri-

stians, they could not agree; and in 1535 came to an open rupture, when the Adeliens threw off the yoke, seeking protection from the Grand Signior. The principal places are, Adela, seated in the centre of the country, and the town where the king resides: Zeila, near the Arabian sea, is a rich town, and has a good trade: Barbora, near the sea-coast, is an ancient trading town. It rains very seldom in this country.

ADELIA, in *Botany*. See **BOTANY Index**.

ADELME, or **ALDHELM**, son to Kenred, nephew to Ina king of the West Saxons, after having been educated abroad, was abbot of Malmesbury 30 years. He was the first Englishman who wrote in Latin, the first who brought poetry into England, and the first bishop of Sherburn. He lived in great esteem till his death, which happened in 709. He was canonized, and many miracles were ascribed to him. He is mentioned with great honour by Camden and Bayle, and his life was written by William of Malmesbury.

ADELPHIANI, in *Church History*, a sect of ancient heretics, who fasted always on Sundays.

ADELSCALC, in *Ancient Customs*, denotes a servant of the king. The word is also written *adelscalche*, and *adelscalcus*. It is compounded of the German *anel*, or *edel*, "noble," and *scalc*, "servant." Among the Bavarians, *adelscalcs* appear to have been the same with royal *thanes* among the Saxons, and those called *ministri regis* in ancient charters.

ADEMPTION, in the *Civil Law*, implies the revocation of a grant, donation, or the like.

ADEN, formerly a rich and considerable town of Arabia the Happy. It is seated by the sea side, a little eastward of the straits of Babelmandel. N. Lat. 12. 40. E. Long. 46. 13.

ADENANTHERA, **EASTARD FLOWER-FENCE**, in *Botany*. See **BOTANY Index**.

ADENBURG, or **ALDENBURG**, a town of Westphalia, and in the duchy of Burg, subject to the Elector Palatine. It is 12 miles N. E. of Cologne, and 17 W. of Bonn. E. Long. 7. 25. N. Lat. 51. 2.

ADENIA, in *Botany*. See **BOTANY Index**.

ADENOGRAPHY, that part of anatomy which treats of the glandular parts. See **ANATOMY**.

ADENOIDES, glandulous, or of a glandular form; an epithet applied to the **PROSTATE**.

ADENOLOGY, the same with Adenography.

ADENOS, a kind of cotton; otherwise called *marine cotton*. It comes from Aleppo by the way of Marseilles, where it pays 20 per cent. duty.

ADEONA, in *Mythology*, the name of a goddess invoked by the Romans when they set out upon a journey.

ADEPHAGIA, in *Mythology*, the goddess of glutony, to whom the Sicilians paid religious worship.

ADEPS, in *Anatomy*, the fat found in the abdomen. It also signifies animal fat of any kind.

ADEPTS, a term among *Alchemists* for those who pretended to have found the panacea and philosophers stone. "Such is the nature, says Paracelsus, of this higher philosophy, that one mortal can no more communicate it to another, than the paper on which letters are traced can of itself declare their meaning. It originates not from man, but from heaven."

ADERBIJAN. See **ADIRBEITSAN**.

ADERNO, a small place in the Val di Demona in the

Adelia
||
Aderno.

Ades
||
Adhoa.

the kingdom of Sicily. E. Long. 15. 25. N. Lat. 38. 5. Anciently *ADRANUM*, at the foot of Mount Gibel. The ruined walls of this ancient city still exhibit an air of its former grandeur.

ADES, or **HADES**, denotes the invisible state. In the heathen mythology, it comprehends all those regions that lie beyond the river Styx, viz. Erebus, Tartarus, and Elysium. See **HELL**.

ADESSENARIANS, **ADESSENARI**, in *Church History*, a sect of Christians who hold the real presence of Christ's body in the eucharist, though not by way of transubstantiation. They differ considerably as to this presence; some holding that the body of Christ is in the bread; others, that it is about the bread; and others that it is under the bread.

ADFIATION, a Gothic custom, whereby the children of a former marriage are put upon the same footing with those of the second. This is also called *unio prolium*, and still retained in some parts of Germany, though Heineccius observes that this is not adoption.

ADFINES, (Antonine), a town of Swisserland supposed to be the modern *Pfn*, in the north of the district of Turgow, on the rivulet Thur, not far from the borders of Suabia, about half-way between Constance and Frauenfeld. So called, because when Ciccina, general of the emperor Vitellius, with the auxiliary Rhctians, defeated the Helvetii, the former extended their borders thus far, their territory ending here; and, in the time of the Romans, it was the last town in this quarter, and of some repute.

ADHA, a festival which the Mahometans celebrate on the 10th day of the month *Dhoulbegiat*, which is the 12th and last of their year. This month being particularly destined for the ceremonies which the pilgrims observe at Mecca, it takes its name from thence, for the word signifies *the month of Pilgrimage*. On that day they sacrifice with great solemnity, at Mecca, and nowhere else, a sheep, which is called by the same name as the festival itself. The Turks commonly call this festival the *Great Bairam*, to distinguish it from the lesser, which ends their fast, and which the Christians of the Levant call the *Easter of the Turks*. The Mahometans celebrate this festival, out of the city of Mecca, in a neighbouring valley; and sometimes they sacrifice there a camel. See **BAIRAM**.

ADHATODA, in *Botany*. See **JUSTICIA**, **BOTANY Index**.

ACTION of **ADHERENCE**, in *Scots Law*; an action competent to a husband or wife, to compel either party to adhere, in case of desertion.

ADHESION, in a general sense, implies the sticking or adhering of bodies together.

ADHESION, in *Philosophy*. See **COHESION**.

ADHESION, in *Anatomy*, a term for one part sticking to another, which in a natural state are separate. For the most part, if any of those parts in the thorax or belly lie in contact, and inflame, they grow together. The lungs very frequently adhere to the pleura.

ADHIL, in *Astronomy*, a star of the sixth magnitude, upon the garment of Andromeda, under the last star in her foot.

ADHOA, in *Ancient Customs*, denotes what we otherwise call *relief*. In which sense we sometimes also

find the word written *adoba*, *adboamentum*, and *adbo-* **Adiantum**
||
Adit.

ADIANTUM, MAIDEN-HAIR; in *Botany*. See **BOTANY Index**.

ADIAPHORISTS, in *Church History*, a name importing lukewarmness, given, in the 16th century, to the moderate Lutherans, who embraced the opinions of Melancthon, whose disposition was much more pacific than that of Luther.

ADJAZZO, **ADRAZZO**, or **AJACCIO**, in *Geography*, a handsome town and castle of Corsica in the Mediterranean, with a bishop's see, and a good harbour. It is populous, and fertile in wine. It is 27 miles south-west of Corte. E. Long. 41. 54. N. Lat. 38. 5.

ADJECTIVE, in *Grammar*, a kind of noun joined with a substantive, either expressed or implied, to denote its qualities or accidents. See **GRAMMAR**.

ADIGE, a river in Italy, which taking its rise south of the lake Glace among the Alps, runs south by Trent, then east by Verona in the territory of Venice, and falls into the gulf of Venice, north of the mouth of the Po.

ADJOURNMENT, the putting off a court, or other meeting, till another day. There is a difference between the adjournment and the prorogation of the parliament; the former not only being for a shorter time, but also done by the house itself; whereas the latter is an act of royal authority.

ADIPOCIRE, derived from *adeps*, fat, and *cera*, wax, denotes a substance which has been lately examined by chemists. It is formed by a certain change which the soft parts of animal bodies undergo, when kept for some time in running water, or when a great number of dead bodies are heaped together in the same place. Great quantities of this substance were found on removing the animal matters from the burial ground of the *Innocens* at Paris in the year 1787. In this burial-ground, 1200 or 1500 bodies were thrown together into the same pit, and being decomposed, were converted into this substance. It has some of the properties of wax or spermaceti. See **CHEMISTRY Index**.

ADIPOSE, a term used by anatomists for any cell, membrane, &c. that is remarkable for its fatness.

ADIRBEITSAN, in *Geography*, a province of Persia, in Asia, and part of the ancient Media. It is bounded on the north by the province of Schirvan, on the south by Irac-Agemi and Curdistan, on the east by Ghilan and the Caspian sea, and on the west by Turcomania. E. Long. 42°. to 48°. N. Lat. 36°. to 39°.

ADIT, in a general sense, the passage to, or entrance of, any thing.

ADIT of a *Mine*, the hole, or aperture, whereby it is entered and dug, and by which the water and ores are carried away. The term amounts to the same with *cuniculus* or *drift*, and is distinguished from *air-shaft*. The adit is usually made on the side of a hill, towards the bottom thereof, about four, five, or six feet high, and eight wide, in form of an arch; sometimes cut in the rock, and sometimes supported with timber, so conducted as that the sole or bottom of the adit may answer to the bottom of the shaft, only somewhat lower, that the water may have a sufficient current to pass away without the use of the pump. Damps and the impurity of the air are the great impediments against driving

Adit
||
Adjuncts.

driving adits above 20 or 30 fathoms, by reason of the necessity, in this case, of letting down air-shafts from the day to meet the adit, which are often very expensive, both on account of the great depth of mines, and the hardness of the mineral strata to be cut through. The best remedy against this is that practised in the coal mines near Liege, where they work their adits without air-shafts: the manner of which is described by Sir James Moray. (*Phil. Transf.* vol. i. p. 79.)

ADIT of a Mine is sometimes used for the air-shaft itself, being a hole driven perpendicularly from the surface of the earth into some part of a mine, to give entrance to the air. To draw off the standing water in winter, in deep mines, they drive up an adit, or air-shaft, upon which the air disengages itself from the water, when it begins to run with such violence as produces a noise equal to the bursting of a cannon, dashes every thing in the way against the sides of the mine, and loosens the very rocks at a distance. (*Ibid.*)

ADJUDICATION, implies the act of adjudging, or determining, a cause in favour of some person.

ADJUDICATION, in *Scots Law*, the name of that action by which a creditor attaches the heritable estate of his debtor, or his debtor's heir, in order to appropriate it to himself, either in payment or security of his debt; or that action by which the holder of an heritable right, labouring under any defect in point of form, may supply that defect.

ADJUNCT, among *Philosophers*, signifies something added to another, without being any necessary part of it. Thus water absorbed by cloth or a sponge, is an adjunct, but no necessary part of either of these substances.

ADJUNCT, in *Metaphysics*, some quality belonging to either the body or mind, whether natural or acquired. Thus thinking is an adjunct of the mind, and growth an adjunct of the body.

ADJUNCT, in *Music*, a word which is employed to denominate the connexion or relation between the principal mode and the modes of its two-fifths, which, from the intervals that constitute the relation between them and it, are called its *adjuncts*.

ADJUNCT is also used to signify a colleague, or some person associated with another as an assistant.

ADJUNCT Gods, or *Adjuncts of the Gods*, among the Romans, were a kind of inferior deities, added as assistants to the principal ones, to ease them in their functions. Thus, to Mars was adjoined Bellona and Nemesis; to Neptune, Salacia; to Vulcan, the Cabiri; to the Good Genius, the Lares; to the Evil, the Lemures, &c.

ADJUNCTS, in *Rhetoric* and *Grammar*, signify certain words or things added to others, to amplify or augment the force of the discourse.

ADJUNCTS, or ADJOINTS, in the Royal Academy of Sciences at Paris, denoted a class of members, attached to the pursuit of particular sciences. The class of *Adjuncts* was created in 1716, in lieu of the *Eleves*: they were twelve in number; two for geometry, two for mechanics, two for astronomy, two for anatomy, two for chemistry, and two for botany. The *Eleves* not taken into this establishment were admitted on the footing of supernumerary *Adjuncts*.

ADJUTANT, in the *Military Art*, is an officer whose business it is to assist the major. Each battalion

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of foot, and regiment of horse has an adjutant, who receives the orders every night from the brigade-major; which, after carrying them to the colonel, he delivers out to the serjeants. When detachments are to be made, he gives the number to be furnished by each company or troop, and assigns the hour and place of rendezvous. He also places the guards; receives and distributes the ammunition to the companies, &c.; and, by the major's orders, regulates the prices of bread, beer, and other provisions. The word is sometimes used by the French for an *aid-du-camp*.

ADJUTANTS-general, among the Jesuits, a select number of fathers, who resided with the general of the order, each of whom had a province or country assigned him, as England, Holland, &c. and their business was to inform the father-general of state occurrences in such countries. To this end they had their correspondents delegated, emissaries, visitors, regents, provincials, &c.

ADJUTORIUM, a term used by physicians for any medicine in a prescription but the capital one.

ADLE-EGGS, such as have not received an impregnation from the semen of the cock.

ADLEGATION, in the public law of the German empire, a right claimed by the states of the empire of adjoining plenipotentiaries, in public treaties and negotiations, to those of the emperor, for the transacting of matters which relate to the empire in general. In which sense *adlegation* differs from *legation*, which is the right of sending ambassadors on a person's own account.—Several princes and states of the empire enjoy the right of *legation*, who have not that of *adlegation*, and *vice versa*. The bishops, for instance, have the right of *adlegation* in the treaties which concern the common interest, but no right of *legation* for their own private affairs. The like had the duke of Mantua.—The emperor allows the princes of Germany the privilege of *legation*, but disputes that of *adlegation*. They challenge it as belonging to them *jure regni*, which they enjoy in common with the emperor himself.

ADLOCUTION, ADLOCUTIO, in *Antiquity*, is chiefly understood of speeches made by Roman generals to their armies, to encourage them before a battle. We frequently find these adlocutions expressed on medals by the abbreviature ADLOCUT. CON.—The general is sometimes represented as seated on a tribunal, often on a bank or mound of turf, with the cohorts ranged orderly round him, in *manipuli* and *turme*. The usual formula in adlocutions was, *Fortis esset ac fidus*.

ADMANUENSES, in ancient law books, denote persons who swore by laying their hands on the book.—In which sense, *admanuenses* amount to the same with laymen; and stand opposed to clerks, who were forbid to swear on the book, their word being reputed as their oath; whence they were also denominated *fide digni*.

ADMEASUREMENT, ADMENSURATIO, in *Law*, a writ which lies for the bringing those to reason, or mediocrity, who usurp more of any thing than their share. This writ lies in two cases; termed,

ADMEASUREMENT of Dower, *Admensuratio dotis*, where the widow of the deceased holds more from the heir, or his guardian, on account of her dower, than of right belongs to her. And,

A a ADMEASUREMENT,

Adjutant
||
Admeasurement.

Admea-
surement
||
Admini-
strator.

ADMEASUREMENT of Pasture, Admensuratio pasuræ; this lies between those who have common of pastures appendant to their freehold, or common by vicinage, in case any of them surcharge the common with more cattle than they ought.

ADMINICLE, a term used chiefly in old law-books, to imply an aid, help, assistance, or support. The word is Latin, *adminiculum*; and derived from *adminiculus*, to prop or support.

ADMINICLE, in *Scots Law*, signifies any writing or deed referred to by a party, in an action of law, for proving his allegations.

ADMINICULATOR, an ancient officer of the church, whose business it was to attend to and defend the cause of the widows, orphans, and others destitute of help.

ADMINISTRATION, in general, the government, direction, or management of affairs, and particularly the exercise of distributive justice. Among ecclesiastics, it is often used to express the giving or dispensing the sacraments, &c.

ADMINISTRATION, is also the name given by the Spaniards in Peru to the staple magazine, or warehouse, established at Callao, a small town on the South sea, which is the port of Lima, the capital of that part of South America, and particularly of Peru. The foreign ships which have leave to trade along that coast are obliged to unload here, paying 13 *per cent.* of the price they sell for, if the cargo be entire, and even 16 *per cent.* if otherwise; besides which, they pay 3 *per 1000*, duty, for consularship and some other small royal rights and claims.

ADMINISTRATOR, in *Law*, he to whom the ordinary commits the administration of the goods of a person deceased, in default of an executor.—An action lies for or against an administrator, as for or against an executor; and he shall be accountable to the value of the goods of the deceased, and no farther:—unless there be waste, or other abuse chargeable on him. If the administrator die, his executors are not administrators; but the court is to grant a new administration.—If a stranger, who is neither administrator nor executor, take the goods of the deceased and administer, he shall be charged and sued as an executor, not as an administrator. The origin of administrators is derived from the civil law. Their establishment in England is owing to a statute made in the 31st year of Edward III. Till then, no office of this kind was known beside that of executor: in case of a want of which, the ordinary had the disposal of goods of persons intestate, &c.

ADMINISTRATOR, in *Scots Law*, a person legally empowered to act for another whom the law presumes incapable of acting for himself. Thus tutors or curators are sometimes styled *administrators in law* to pupils, minors, or fatuous persons. But more generally the term is used to imply that power which is conferred by the law upon a father over the persons and property of his children during their minority. See *LAW*.

ADMINISTRATOR is sometimes used for the president of a province: for a person appointed to receive, manage, and distribute, the revenues of an hospital or religious house; for a prince who enjoys the revenues of a secularized bishopric; and for the regent of a king-

dom during the minority of a prince, or a vacancy of the throne.

ADMIRABILIS SAL, the same with **GLAUBER'S** salt.

ADMIRAL, a great officer or magistrate, who has the government of a navy, and the hearing of all maritime causes.

Authors are divided with regard to the origin and denomination of this important officer, whom we find established in most kingdoms that border on the sea. But the most probable opinion is that of Sir Henry Spelman, who thinks, that both the name and dignity were derived from the Saracens, and, by reason of the holy wars, brought amongst us; for *admiral*, in the Arabian language, signifies a prince, or chief ruler, and was the ordinary title of the governors of cities, provinces, &c. and therefore they called the commander of the navy by that name, as a name of dignity and honour. And indeed there are no instances of admirals in this part of Europe before the year 1284, when Philip of France, who had attended St Lewis in the wars against the Saracens, created an admiral. Du Cange assures us, that the Sicilians were the first, and the Genoese the next, who gave the denomination of *admiral* to the commanders of their naval armaments; and that they took it from the Saracen or Arabic *emir*, a general name for every commanding officer. As for the exact time when the word was introduced among us, it is uncertain; some think it was in the reign of Edward I. Sir Henry Spelman is of opinion that it was first used in the reign of Henry III. because neither the laws of Oleron, made in 1266, nor Bracton, who wrote about that time, make any mention of it; and that the term *admiral* was not used in a charter in the eighth of Henry III. where he granted this office to Richard de Lacy, by these words *Maritimum Angliæ*; but in the 56th year of the same reign, not only the historians, but the charters themselves, very frequently used the word *admiral*.

Anciently there were generally three or four admirals appointed in the English seas, all of them holding the office *durante bene placito*; and each of them having particular limits under their charge and government; as admirals of the fleet of ships, from the mouth of the Thames, northward, southward, or westward. Besides these, there were admirals of the Cinque Ports, as in the reign of Edward III. when one William Latimer was styled *admiralis quinque portuum*; and we sometimes find that one person has been admiral of the fleets to the southward, northward, and westward: but the title of *admiralis Angliæ* was not frequent till the reign of Henry IV. when the king's brother had that title given him, which in all commissions afterwards was granted to the succeeding admirals. It may be observed, that there was a title above that of admiral of England, which was, *locum tenens regis super mare*, the king's lieutenant general of the sea; this title we find mentioned in the reign of Richard II. Before the use of the word *admiral* was known, the title of *custos maris* was made use of.

Lord High ADMIRAL of England, in some ancient records called *capitanus maritimarum*, an officer of great antiquity and trust, as appears by the laws of Oleron, so denominated from the place at which they were made by Richard I. The first title of *admiral of England*, expressly

Admira-
bilis,
Admiral.

Admiral. preſely conferred upon a ſubject, was given by patent of Richard II. to Richard Fitz-Allen, jun. earl of Arundel and Surrey; for thoſe who before enjoyed this office were ſimply termed *admirals*, though their jurisdiction ſeems as extenſive, eſpecially in the reign of Edward III. when the court of admiralty was firſt erected.

This great officer has the management of all maritime affairs, and the government of the royal navy, with power of deciſion in all maritime caſes both civil and criminal: he judges of all things done upon or beyond the ſea, in any part of the world; upon the ſea coaſts, in all ports and havens, and upon all rivers below the firſt bridge from the ſea. By him, vice-admirals, rear admirals, and all ſea captains, are commiſſioned; all deputies for particular coaſts, and coroners to view dead bodies found on the ſea coaſts, or at ſea: he alſo appoints the judges for his court of admiralty, and may impriſon, releaſe, &c. All ports and havens are *infra corpus comitatus*, and the admiral hath no jurisdiction of any thing done in them. Between high and low water mark, the common law and the high admiral have jurisdiction by turns, one upon the water, and the other upon the land.

The lord admiral has power, not only over the ſeamen ſerving in his ſhips of war, but over all other ſeamen, to arreſt them for the ſervice of the ſtate; and, if any of them run away, without leave of the admiral, he hath power to make a record thereof, and certify the ſame to the ſheriffs, mayors, bailiffs, &c. who ſhall cauſe them to be apprehended and impriſoned.

To the lord high admiral belong all penalties and amercements of all tranſgreſſions at ſea, on the ſea ſhore, in ports and havens, and all rivers below the firſt bridge from the ſea; the goods of pirates and felons condemned or enlaved, ſea wrecks, goods floating on the ſea, or caſt on the ſhore (not granted to lords of manors adjoining to the ſea), and a ſhare of lawful prizes; alſo all great ſiſhes, commonly called *royal fiſhes*, except whales and ſurgeons: to which add, a ſalary of 7000*l.* a-year.

In ſhort, this is ſo great an office, in point of truſt, honour, and profit, that it has been uſually given to princes of the blood, or the moſt eminent perſons among the nobility. We have had no high admiral for ſome years; the office being put in commiſſion, or under the administration of the lords commiſſioners of the admiralty, who by patent have the ſame power and authority as the lord high admiral.

Lord High Admiral of Scotland, one of the great officers of the crown, and ſupreme judge in all maritime caſes within that part of Britain. See *LAW*.

ADMIRAL alſo implies the commander in chief of any ſingle fleet or ſquadron; or, in general, any flag-officer whatever. The commander of a fleet carries his flag at the main-top-maſt head. Thus we ſay, *admiral of the red*, of the *white*, of the *blue*.

Vice Admiral, is the commander of the ſecond ſquadron, and carries his flag at the fore-top-maſt head.

Rear Admiral, is the commander of the third ſquadron, and carries his flag at the mizen-top-maſt head.

Vice Admiral, is alſo an officer appointed by the lords commiſſioners of the admiralty. There are ſeveral of theſe officers eſtabliſhed in different parts of

Great Britain, with judges and maſtals under them, for executing jurisdiction within their reſpective limits. Their decrees, however, are not final, an appeal lying to the court of admiralty in London.

ADMIRAL is alſo an appellation given to the moſt conſiderable ſhip of a fleet of merchantmen, or of the veſſels employed in the cod fiſhery of Newfoundland. This laſt has the privilege of chooſing what place he pleaſes on the ſhore to dry his fiſh; gives proper orders, and appoints the fiſhing places to thoſe who come after him; and as long as the fiſhing ſeaſon continues, he carries a flag on his main-maſt.

ADMIRAL, in *Conchology*, the Engliſh name of a ſpecies of the voluta, a ſhell fiſh belonging to the order of vermes teſtacea. See *CONCHOLOGY Index*.

ADMIRALTY properly ſignifies the office of lord high admiral, whether diſcharged by one ſingle perſon, or by joint commiſſioners called *lords of the admiralty*.

Court of ADMIRALTY, is a ſovereign court, held by the lord high admiral, or lords of the admiralty, where cognizance is taken in all maritime affairs, whether civil or criminal.—All crimes committed on the high ſea, or on great rivers below the firſt bridge next the ſea, are cognizable in this court only, and before which they muſt be tried by judge and jury. But in civil caſes the mode is different, the deciſions being all made according to the civil law. From the ſentences of the admiralty judge an appeal always lay, in ordinary courſe, to the king in chancery, as may be collected from ſtatute 25 Hen. VIII. c. 19, which directs the appeal from the archbiſhop's courts to be determined by perſons named in the king's commiſſion, "like as in caſe of appeal from the admiral court." But this is alſo expreſly declared by ſtatute 8 Eliz. c. 5, which enacts, that upon an appeal made to the chancery, the ſentence definitive of the delegates appointed by commiſſion ſhall be final.

Appeals from the vice-admiralty courts in America, and our other plantations and ſettlements, may be brought before the courts of admiralty in England, as being a branch of the admiral's jurisdiction, though they may alſo be brought before the king in council. But in caſe of prize veſſels, taken in time of war, in any part of the world, and condemned in any courts of admiralty or vice-admiralty as lawful prize, the appeal lies to certain *commiſſioners of appeals* conſiſting chiefly of the privy council, and not to judges delegates. And this by virtue of divers treaties with foreign nations, by which particular courts are eſtabliſhed in all the maritime countries of Europe for the deciſion of this queſtion, Whether lawful prize or not? for this being a queſtion between ſubjects of different ſtates, it belongs entirely to the law of nations, and not to the municipal laws of either country, to determine it.

Court of ADMIRALTY, in Scotland. See *LAW*.

ADMIRALTY Bay, in *Geography*, a ſpacious bay with good anchorage on the weſt coaſt of Cook's ſtraits, in the ſouthern iſland of New Zealand. S. Lat. 40. 37. E. Long. 174. 54.

There is a bay of the ſame name on the north-weſt coaſt of America, in N. Lat. 59. 31. W. Long. 140. 18.

ADMIRALTY Inlet, the entrance to the ſuppoſed ſtraits of Juan de Fuca, on the weſt coaſt of New Georgia,

Admiralty in N. Lat. 48. 30. W. Long. 124. 15. It was visited by Captain Vancouver in 1792, who found the soil on the shores rich and fertile, well watered, and clothed with luxuriant vegetation.

ADMIRALTY ISLANDS lie in about 2° 18' S. Lat. and 146° 44' E. Long. There are between 20 and 30 islands said to be scattered about here, one of which alone would make a large kingdom. Captain Carteret, who first discovered them, was prevented from touching at them, although their appearance was very inviting, on account of the condition of his ship, and of his being entirely unprovided with the articles of barter which suit an Indian trade. He describes them as clothed with a beautiful verdure of woods, lofty and luxuriant, interperfed with spots that have been cleared for plantations, groves of cocoa nut trees, and houses of the natives, who seem to be very numerous. The largest of these islands is 18 leagues long in the direction of east and west. The discoverer thinks it highly probable that these islands produce several valuable articles of trade, particularly spices, as they lie in the same climate and latitude as the Moluccas.

ADMIRATION, in *Ethics*, is that passion of the mind which is excited by the contemplation of superior and rare excellence, as superior or uncommon wisdom, ingenuity, or benevolence.

ADMONITION, in *Ecclesiastical Affairs*, a part of discipline much used in the ancient church. It was the first act, or step, towards the punishment or expulsion of delinquents. In case of private offences, it was performed, according to the evangelical rule, privately: in case of public offence, openly, before the church. If either of those suited for the recovery of the fallen person, all further proceedings in the way of censure ceased: if they did not, recourse was had to excommunication.

ΑΔΜΟΝΙΤΙΟ Fustium, a military punishment among the Romans, not unlike our whipping, but it was performed with vine branches.

ADMORTIZATION, in the *Feudal Customs*, the reduction of the property of lands or tenements to mortmain. See **MORTMAIN**.

ADNATA, in *Anatomy*, one of the coats of the eye, which is also called *conjunctiva* and *albuginea*.

ADNATA is also used for any hair, wool, or the like, which grows upon animals or vegetables.

ADNATA, or *Adnascencia*, among *Gardeners*, denote those offsets, which by a new germination under the earth, proceed from the lily, narcissus, hyacinth, and other flowers, and afterwards become true roots.

ADNOU, is used by some grammarians to express what we more usually call an adjective.—The word is formed by way of analogy to adverb; in regard adjectives have much the same office and relation to nouns that adverbs have to verbs. Bishop Wilkins uses the word *adname* in another sense, viz. for what we otherwise call a preposition.

ADOLESCENCE, the state of growing youth; or that period of a person's age, commencing from his infancy, and terminating at his full stature or manhood. The word is formed of the Latin *adolescere*, "to grow."—The state of adolescence lasts so long as the fibres continue to grow, either in magnitude or firmness. The fibres being arrived at the degree of firmness and tension sufficient to sustain the parts, no longer

yield or give way to the efforts of the nutritious matter to extend them; so that their farther accretion is stopped, from the very law of their nutrition. Adolescence is commonly computed to be between 15 and 25, or even 30 years of age; though in different constitutions its terms are very different.—The Romans usually reckoned it from 12 to 25 in boys; and to 21 in girls, &c. And yet, among their writers, *juvenis* and *adolescens* are frequently used indifferently for any person under 45 years.

ADOLLAM, or **ODOLLAM**, in *Ancient Geography*, a town in the tribe of Judah, to the east of Eleutheropolis. David is said to have hid himself in a cave near this town (Bible).

ADOM, in *Geography*, a state or principality of the Gold coast, in Africa. It is a populous, rich, and fertile country, abounding with corn and fruits.

ADON, a populous village in the province of Stuhl-Weissenberg, belonging to Hungary. It lies in a fruitful country, towards the river Danube. E. Long. 19. 20. N. Lat. 47. 30.

ADONAI, one of the names of the Supreme Being in the Scriptures. The proper meaning of the word is *my lords*, in the plural number; as *Adoni* is *my lord*, in the singular. The Jews, who either out of respect, or superstition, do not pronounce the name of *Jehovah*, read *Adonai* in the room of it, as often as they meet with *Jehovah* in the Hebrew text. But the ancient Jews were not so scrupulous; nor is there any law which forbids them to pronounce the name of God. (Calmet.)

ADONIA, in *Antiquity*, solemn feasts in honour of Venus, and in memory of her beloved Adonis. The Adonia were observed with great solemnity by most nations; Greeks, Phœnicians, Lycians, Syrians, Egyptians, &c. From Syria, they are supposed to have passed into India. The prophet Ezekiel* is understood to speak of them. They were still observed at Alexandria in the time of St Cyril; and at Antioch in that of Julian the Apostate, who happened to enter that city during the solemnity, which was taken for an ill omen. The Adonia lasted two days: on the first of which certain images of Venus and Adonis were carried, with all the pomp and ceremonies practised at funerals: the women wept, tore their hair, beat their breasts, &c. imitating the cries and lamentations of Venus for the death of her paramour. This lamentation they called *Adonacrus*. The Syrians were not contented with weeping, but subjected themselves to severe discipline, shaved their heads, &c. Among the Egyptians, the queen herself used to carry the image of Adonis in procession. St Cyril mentions an extraordinary ceremony practised by the Alexandrians: A letter was written to the women of Byblus, to inform them that Adonis was found again: this letter was thrown into the sea, which (it was pretended) did not fail punctually to convey it to Byblus in seven days; upon the receipt of which, the Byblian women ceased their mourning, sung his praises, and made rejoicings as if he were raised to life again: Or rather, according to Meursius, the two offices of mourning and rejoicing made two distinct feasts, which were held at different times of the year, the one six months after the other, Adonis being supposed to pass half the year with Proserpine, and half with Venus.—The Egyptian Adonia are said to have been held in memory

Adollam
|
Adonia.

* Ch. viii.
xiv.

Adonides memory of the death of Osiris; by others, of his sickness and recovery. Bishop Patrick dates their origin from the slaughter of the first born under Moses.

||
Adoptiani.

ADONIDES, in *Botany*, a name given to botanists who described or made catalogues of plants cultivated in any particular place.

ADONIS, son of Cynaras king of Cyprus, the darling of the goddess Venus: being killed by a wild boar, in the Idalian woods, he was turned into a flower of a blood colour, supposed to be the anemone. Venus was inconsolable; and no grief was ever more celebrated than this, most nations having perpetuated the memory of it by a train of anniversary ceremonies*. Among Shakespeare's poems, is a long one on the subject of Venus's affection for Adonis.

* See *Adonia*.

The text of the vulgate in Ezekiel viii. 14. says, that this prophet saw women sitting in the temple, and weeping for Adonis: but, according to the reading of the Hebrew text, they are said to weep for Thammuz, or the *hidden one*. Among the Egyptians, Adonis was adored under the name of Osiris the husband of Isis. But he was sometimes called by the name of Ammuz, or Thammuz, *the concealed*, to denote probably his death or burial. The Hebrews, in derision, call him sometimes *the dead*, Psa. cvi. 28. and Lev. xix. 28. because they wept for him, and represented him as one dead in his coffin; and at other times, they call him *the image of jealousy*, Ezek. viii. 3. 5. because he was the object of the god Mars's jealousy. The Syrians, Phœnicians, and Cyprians, called him Adonis; and F. Calmet is of opinion, that the Ammonites and Moabites gave him the name of Baal-peor. See BAAL-PEOR.

ADONIS, *Adonius*, in *Ancient Geography*, a river of Phœnicia, rising in Mount Lebanon, and falling into the sea, after a north-west course, at Byblus; famous in fable, as a beautiful shepherd youth (Virgil); son of Cynaras, king of the Cyprians, loved by Venus, slain by a boar, and turned into a river. Theocritus laments him dead in an idyllion, or rather ode, as did the women yearly, when, in flood time, the river rolled down a red earth, which tinged its waters, deemed to be his wound bleeding afresh. In the Phœnician language Adan signifies a willow, and Adon lord, with the same radical letters. Hence *Ἰταῖος Ἀδωνίς*, *Salignus*, and *Κυρίος*, or *Κυρίος Ἀδωνίς* for *Κυρίος*. *Adonidis horti*, are gardens beautifully arranged, but more adapted for pleasure than profit.

ADONIS, *Bird's eye*, or *Pheasant's eye*, in *Botany*. See BOTANY *Index*.

ADONISTS, a sect or party among divines and critics, who maintain, that the Hebrew points ordinarily annexed to the consonants of the word Jehovah, are not the natural points belonging to that word, nor express the true pronunciation of it; but are the vowel points, belonging to the words *Adonai* and *Elohim*, applied to the consonants of the ineffable name Jehovah, to warn the readers, that instead of the word Jehovah, which the Jews were forbidden to pronounce, and the true pronunciation of which had been long unknown to them, they are always to read *Adonai*. They are opposed to *Jehovists*: of whom the principal are Drusus, Capellus, Buxtorf, Alting, and Reland. who has published a collection of their writings on this subject.

ADOPTIANI, in *Church History*, a sect of ancient

heretics, followers of Felix of Urgel, and Elipand of Toledo, who, towards the end of the eighth century, advanced the notion, that Jesus Christ, in his human nature, is the Son of God, not by nature, but by adoption.

ADOPTION, an act by which any one takes another into his family, owns him for his son, and appoints him for his heir.

The custom of adoption was very common among the ancient Greeks and Romans; yet it was not practised, but for certain causes expressed in the laws, and with certain formalities usual in such cases. It was a sort of imitation of nature, intended for the comfort of those who had no children: wherefore he that was to adopt was to have no children of his own, and to be past the age of getting any; nor were eunuchs allowed to adopt, as being under an actual impotency of begetting children; neither was it lawful for a young man to adopt an elder, because that it would have been contrary to the order of nature: nay, it was even required that the person who adopted should be eighteen years older than his adopted son, that there might at least appear a probability of his being the natural father.

Among the Greeks it was called *ἰσότης*, *filiation*. It was allowed to such as had no issue of their own; excepting those who were not *κυριοὶ ἑαυτῶν*, *their own masters*, e. g. slaves, women, madmen, infants, or persons under twenty years of age; who being incapable of making wills, or managing their own estates, were not allowed to adopt heirs to them. Foreigners being incapable of inheriting at Athens, if any such were adopted, it was necessary first to make them free of the city. The ceremony of adoption being over, the adopted had his name enrolled in the tribe and ward of his new father; for which entry a peculiar time was allotted, viz. the festival *θαιρηλια*. To prevent rash and inconsiderate adoptions, the Lacedæmonians had a law, that adoptions should be transacted, or at least confirmed, in the presence of their kings. The children adopted were invested with all the privileges, and obliged to perform all the duties, of natural children; and being thus provided for in another family, ceased to have any claim of inheritance, or kindred, in the family which they had left, unless they first renounced their adoption; which, by the laws of Solon, they were not allowed to do, unless they had first begotten children, to bear the name of the person who had adopted them: thus providing against the ruin of families, which would otherwise have been extinguished by the desertion of those who had been adopted to preserve them. If the children adopted happened to die without children, the inheritance could not be alienated from the family into which they had been adopted, but returned to the relations of the adopter. It should seem, that by the Athenian law, a person, after having adopted another, was not allowed to marry without permission from the magistrate: in effect, there are instances of persons, who being ill used by their adoptive children, petitioned for such leave. However this be, it is certain some men married after they had adopted sons: in which case, if they begat legitimate children, their estates were equally shared between the begotten and adopted.

The Romans had two forms of adoption; one before

Adoption. fore the prætor; the other at an assembly of the people, in the times of the commonwealth, and afterwards by a rescript of the emperor. In the former, the natural father addressed himself to the prætor, declaring that he emancipated his son, resigned all his authority over him, and consented he should be translated into the family of the adopter. The latter was practised, where the party to be adopted was already free; and this was called *adrogation*. The person adopted changed all his names; assuming the prename, name, and surname, of the persons who adopted him.

Besides the formalities prescribed by the Roman law, various other methods have taken place; which have given denominations to different species of adoption, among the Gothic nations, in different ages. As,

Adoption by arms, was when a prince made a present of arms to a person, in consideration of his merit and valour. Thus it was that the king of the Heruli was adopted by Theodoric; Athalaric by the emperor Justinian; and Cosroes, nephew of the king of Persia, by the emperor Justin.—The obligation here laid on the adoptive son was, to protect and defend the father from injuries, affronts, &c. And hence, according to Selden, the ceremony of dubbing knights took its origin as well as name.

Adoption by baptism, is that spiritual affinity which is contracted by god-fathers and god-children in the ceremony of baptism. This kind of adoption was introduced into the Greek church, and came afterwards into use among the ancient Franks, as appears by the Capitulars of Charlemagne.

In reality, the god-father was so far considered as adoptive father, that his god-children were supposed to be entitled to a share in the inheritance of his estate.

Adoption by hair, was performed by cutting off the hair of a person, and giving it to the adoptive father. It was thus that Pope John VIII. adopted Boson king of Arles; which, perhaps, is the only instance in history, of adoption, in the order of the ecclesiastics; a law that professes to imitate nature, not daring to give children to those in whom it would be thought a crime to beget any.

Adoption by matrimony, is the taking the children of a wife or husband, by a former marriage, into the condition of proper or natural children; and admitting them to inherit on the same footing with those of the present marriage. This is a practice peculiar to the Germans: among whom, it is more particularly known by the name of *einkindschaft*; among their writers in Latin, by that of *unio prolium*, or *union of issues*. But the more accurate writers observe, that this is no adoption. See **ADFFILIATION**.

Adoption by testament, that performed by appointing a person heir by will, on condition of his assuming the name, arms, &c. of the adopter. Of which kind we meet with several instances in the Roman history.

Among the Turks, the ceremony of adoption is performed by obliging the person adopted to pass through the shirt of the adopter. Hence, among that people to adopt, is expressed by the phrase, *to draw another through my shirt*. It is said, that something like this has also been observed among the Hebrews; where the prophet Elijah adopted Elisha for his son and successor, and communicated to him the gift of prophecy, by let-

ting fall his cloak or mantle on him. But adoption, properly so called, does not appear to have been practised among the ancient Jews: Moses says nothing of it in his laws; and Jacob's adoption of his two grandsons, Ephraim and Manasseh, is not so properly an adoption, as a kind of substitution, whereby those two sons of Joseph were allotted an equal portion in Israel with his own sons.

ADOPTION is also used, in *Theology*, for a federal act of God's free grace; whereby those who are regenerated by faith, are admitted into his household, and entitled to a share in the inheritance of the kingdom of heaven.

ADOPTION is sometimes also used, in speaking of the ancient clergy, who had a custom of taking a maid or widow into their houses, under the denomination of an *adoptive* or *spiritual sister* or *niece*.

ADOPTION is also used in speaking of the admission of persons into certain hospitals, particularly that of Lyons, the administrators whereof have all the power and rights of parents over the children admitted.

ADOPTION is also used for the reception of a new academy into the body of an old one.—Thus

The French academy of Marseilles was adopted by that of Paris: on which account, we find a volume of speeches extant, made by several members of the academy of Marseilles, deputed to return thanks to that of Paris for the honour.

In a similar sense, adoption is also applied by the Greeks, to the admitting a monk, or brother, into a monastic community; sometimes called *spiritual adoption*.

ADOPTIVE, denotes a person or thing adopted by another.

Adoptive children, among the Romans, were on the same footing with natural ones; and accordingly were either to be instituted heirs, or expressly disinherited, otherwise the testament was null. The emperor Adrian preferred adoptive children to natural ones; because we choose the former, but are obliged to take the latter at random.

M. Menage has published a book of eloges, or verses addressed to him; which he calls *Liber Adoptivus*, an adoptive book; and adds it to his other works.—Heinrius, and Furstemburg of Munster, have likewise published adoptive books.

In ecclesiastical writers we find adoptive women, or sisters, (*adoptivæ faminae* or *sorores*), used for those handmaids of the ancient clergy, otherwise called *sub-introducæ*.

ADOPTIVE arms, are those which a person enjoys by the gift or concession of another, and to which he was not otherwise entitled. They stand contradicting with arms of alliance.

We sometimes meet with adoptive heir, by way of opposition to natural heir; and adoptive gods, by way of contradistinction to domestic ones. The Romans, notwithstanding the number of their domestic, had their adoptive gods, taken chiefly from the Egyptians: such were Isis, Osiris, Anubis, Apis, Harpocrates, and Canopus.

ADORATION, the act of rendering divine honours; or of addressing a being, as supposing it a god. The word is compounded of *ad*, "to;" and *os*, *oris*, "mouth;" and literally signifies to apply the hand

Adoration. to the mouth; *Manum ad os admovere*, q. d. "to kiss the hand;" this being, in the eastern countries, one of the great marks of respect and submission.—The Romans practised adoration at sacrifices, and other solemnities; in passing by temples, altars, groves, &c. at the sight of statues, images, or the like, whether of stone or wood, wherein any thing of divinity was supposed to reside. Usually there were images of the gods placed at the gates of cities, for those who went in or out, to pay their respects to.—The ceremony of adoration among the ancient Romans was thus: The devotee having his head *covered*, applied his right hand to his lips, the fore finger resting on his thumb, which was erect, and thus bowing his head, turned himself round from left to right. The kiss thus given was called *osculum labratum*; for ordinarily they were afraid to touch the images of their gods themselves with their profane lips. Sometimes, however, they would kiss their feet, or even knees, it being held an incivility to touch their mouths; so that the affair passed at some distance. Saturn, however, and Hercules, were adored with the head *bare*; whence the worship of the last was called *institutum peregrinum*, and *ritus Græcænicus*, as departing from the customary Roman method, which was to sacrifice and adore with the face veiled, and the clothes drawn up to the ears, to prevent any interruption in the ceremony by the sight of unlucky objects.—The Jewish manner of adoration was by prostration, bowing, and kneeling.—The Christians adopted the Grecian rather than the Roman method, and adored always *uncovered*. The ordinary posture of the ancient Christians was kneeling, but on Sundays standing: and they had a peculiar regard to the east, to which point they ordinarily directed their prayers.

ADORATION is more particularly used for the act of praying, or preferring our requests or thanksgivings to Almighty God.

ADORATION is also used for certain extraordinary civil honours or respects which resemble those paid to the deity, yet are given to men.

The Persian manner of adoration, introduced by Cyrus, was by bending the knee, and falling on the face at the prince's feet, striking the earth with the forehead, and kissing the ground. This ceremony, which the Greeks called *προσκύνησις*, Conon refused to perform to Artaxerxes, and Callisthenes to Alexander the Great, as repugnant to impiety and unlawful.

The adoration performed to the Roman and Grecian emperors consisted in bowing or kneeling at the prince's feet, laying hold of his purple robe, and presently withdrawing the hand and clapping it to the lips. Some attribute the origin of this practice to Constantius. It was only persons of some rank or dignity that were entitled to the honour. Bare kneeling before the emperor to deliver a petition, was also called *adoration*.

The practice of adoration may be said to be still subsisting in England, in the ceremony of kissing the king's or queen's hand, and in serving them at table, both being performed kneeling.

ADORATION is more particularly used for kissing one's hand in presence of another, as a token of reverence. The Jews adored by kissing their hands and bowing down their heads; whence, in their language, *kissing* is properly used for *adoration*.

ADORATION is also used among Roman writers for

a high species of applause given to persons who had spoken or performed well in public. (See ACCLAMATION.) We meet with adoration paid to orators, actors, musicians, &c. The method of expressing it was, by rising, putting both hands to their mouth, and then returning them towards the person intended to be honoured.

ADORATION is also used, in the court of Rome, for the ceremony of kissing the pope's feet.—The introduction of adoration among the Romans is ascribed to the low flattery of Vitellius, who, upon the return of C. Cæsar from Syria, would not approach him otherwise than with his head covered, turning himself round, and then falling on his face. Heliogabalus restored the practice, and Alexander Severus again prohibited it. Dioclesian redemanded it; and it was, in some measure, continued under the succeeding princes, even after the establishment of Christianity, as Constantine, Constantius, &c. It is particularly said of Dioclesian, that he had gems fastened to his shoes, that divine honours might be more willingly paid him, by kissing his feet. The like usage was afterwards adopted by the popes, and is observed to this day. These prelates, finding a vehement disposition in the people to fall down before them and kiss their feet, procured crucifixes to be fastened on their slippers; by which stratagem, the adoration intended for the pope's person is supposed to be transferred to Christ. Divers acts of this adoration we find offered even by princes to the pope.

ADORATION is also used for a method of electing a pope. The election of popes is performed two ways; by *adoration* and by *scrutiny*. In election by adoration, the cardinals rush hastily, as if agitated by some spirit, to the adoration of some one among them, to proclaim him pope. When the election is carried by scrutiny, they do not adore the new pope till he is placed on the altar.

Barbarous ADORATION is a term used, in the laws of King Canute, for that performed after the manner of the Heathens who adored idols. The Romish church is charged with the adoration of saints, martyrs, images, crucifixes, relics, the virgin, and the host; all which by Protestants are generally aggravated into idolatry, on a supposition, that the honour thus paid to them is absolute and supreme, called by way of distinction *Latria*, which is due only to God. Roman Catholics, on the contrary, explain them, as only a relative or subordinate worship, called *Dulia* and *Hyperdulia*, which terminates ultimately in God alone. But may not the same be said of the idol worship of the heathens? The Phœnicians adored the winds, on account of the terrible effects produced by them; the same was adopted by most of the other nations, Persians, Greeks, Romans, &c. The Persians chiefly paid their adorations to the sun and fire; some say also to rivers, the wind, &c. The motive of adoring the sun was the benefits they received from that glorious luminary, which of all creatures has doubtless the best pretensions to such homage.

ADOREA, in *Roman Antiquity*, a word used in different senses; sometimes for all manner of grain, sometimes for a kind of cakes made of fine flour, and offered in sacrifice; and finally for a dole or distribution of corn, as a reward for some service; whence by metonymy it is put for praise or rewards in general.

ADOSCULATION,

Adoration,
Adorea.

Adosculation
tion
||
Adranum.

ADOSCULATION, a term used by Dr Grew, to imply a kind of impregnation, without intromission; and in this manner he supposes the impregnation of plants is effected by the falling of the farina fecundans on the pistil.

ADOSSEE', in *Heraldry*, signifies two figures or bearings being placed back to back.

ADOUR, the name of a river of France, which rises in the mountains of Bigorre, in the department of the Upper Pyrenees, and running north by Tarbes through Gascony, afterwards turns east, and passing by Dax, falls into the bay of Biscay, below Bayonne.

ADOWA, the capital of Tigré in Abyssinia, is situated on the declivity of a hill, on the west side of a small plain, which is surrounded on every side by mountains. The name, signifying, *pass*, or *passage*, is characteristic of its situation; for the only road from the Red sea to Gondar passes by Adowa. The town consists of 300 houses, is the residence of the governor, and has a manufactory of coarse cotton cloth which circulates in Abyssinia as the medium of exchange in place of money. N. Lat. 14. 7. E. Long. 38. 50.

ADOXA, **TUBEROUS MOSCHATEL**, **HOLLOW-ROOT**, or **INGLORIOUS**, in *Botany*. See **BOTANY INDEX**.

AD PONDUS OMNIUM, among *Physicians*, an abbreviation in their prescriptions, signifying that the last mentioned ingredient is to weigh as much as all the rest together.

Ad Quod Damnum, in the *English Law*, a writ directed to the sheriff, commanding him to inquire into the damage which may arise from granting certain privileges to a place, as a fair, a market, or the like.

ADRA, in *Geography*, a sea-port town of the province of Granada, in Spain, 47 miles south-east of Granada. N. Lat. 36. 42. E. Long. 2. 37.

ADRACHNE, in *Botany*, a species of the strawberry tree. See **ARBUTUS**, **BOTANY INDEX**.

ADRAMMELECH, one of the gods of the inhabitants of Sepharvaim, who were settled in the country of Samaria, in the room of those Israelites who were carried beyond the Euphrates. The Sepharvites made their children pass through the fire, in honour of this idol and another called *Anamelech*. It is supposed, that Adrammelech meant the sun, and Anamelech the moon: the first signifies *the magnificent king*; the second *the gentle king*.

ADRAMYTTIUM, in *Ancient Geography, now *Andramitti*, a town of Mysia Major, at the foot of Mount Ida, an Athenian colony, with a harbour and dock near the Caicus. *Adramyttenus* the epithet; as, *Adramyttenus Sinus*, a part of the Egean sea, on the coast of Mysia; *Adramyttenus Conventus*, sessions or assizes, the eighth in order of the nine *Conventus Juridici* of the province of Asia.*

ADRANA, a river of Germany (Polybius); now the Eder, rising on the borders of the county of Nassau, to the north-east of, and not far from Dillenburg, running through the landgraviate of Hesse, the county of Waldeck, by Fritzlar, and then again through the landgraviate, and, together with the Fulda, falling into the Weser, to the south of, and not far from Cassel.

ADRANUM, or **HADRANUM**, in *Ancient Geography*, now **ADERNO**, which see.

ADRASTEIA, in *Mythology, was the daughter of Jupiter and Necessity, and, according to Plutarch, the only fury who executed the vengeance of the gods. The name is derived from King Adraustus, who first erected a temple to that deity.*

Adrasteia
||
Adrian.

ADRASTEIA Certamina, in *Antiquity*, a kind of Pythian games, instituted by Adraustus king of Argos, in the year of the world 2700, in honour of Apollo, at Sicyon. These are to be distinguished from the Pythian games celebrated at Delphi.

ADRASTUS, in *Ancient History*, king of Argos, son of Talauus and Lysianissa, daughter of Polybius king of Sicyon, acquired great honour in the famous war of Thebes, in support of Polynices his son-in-law, who had been excluded the sovereignty of Thebes by Eteocles his brother, notwithstanding their reciprocal agreement. Adraustus, followed by Polynices, and Tydeus his other son-in-law, by Capaneus and Hippomedon his sister's sons, by Amphiarus his brother-in-law, and by Parthenopæus, marched against the city of Thebes; and this is the expedition of the Seven Worthies, which the poets have so often sung. They all lost their lives in this war except Adraustus, who was saved by his horse called *Arion*. This war was revived ten years after by the sons of those deceased warriors, which was called the *war of the Epigones*, and ended with the taking of Thebes. None of them lost their lives except Ægialeus son of Adraustus; which afflicted him so much that he died of grief in Megara, as he was leading back his victorious army.

ADRAZZO, or **AJACCIO**. The same with **ADJAZZO**, which see.

ADRIA, or **HADRIA**, in *Ancient Geography*, the name of two towns in Italy. One in the country of the Veneti, on the river Tartarus, between the Padus and the Athesis, called *Atria* by Pliny and Ptolemy, but *Adrias* by Strabo. Another on the river Vomano, in the territory of the Piceni (to which Antonine's Itinerary from Rome is directed), the country of the ancestors of the emperor Adrian. From which of these the Adriatic sea is denominated, is matter of doubt. A third opinion is, that it is so called from Adrias the son of Joan, of Italian origin; (Eustathius in Dionysium).

ADRIAN, or **HADRIAN**, **PUBLIUS ÆLIUS**, the Roman emperor. He was born at Rome the 24th of January, in the 76th year of Christ, A. U. C. 829. His father left him an orphan, at ten years of age, under the guardianship of Trajan, and Cælius Tatianus a Roman knight. He began to serve very early in the armies, having been tribune of a legion before the death of Domitian. He was the person chosen by the army of Lower Mœsia, to carry the news of Nerva's death to Trajan, successor to the empire. Trajan, however, conceived some prejudices against him, and Adrian perceiving that he was no favourite with the emperor, endeavoured to ingratiate himself with the empress Plotina, by which means he succeeded in obtaining for his wife, Sabina, the emperor's grand-niece and next heirs. This was probably the first step to his future advancement, and facilitated his ascent to the throne. As quaestor he accompanied Trajan in most of his expeditions, and particularly distinguished himself in the second war against the Dacians. Afterwards he was successively tribune of the people, prætor, governor

Adrian. governor of Pannonia, and consul. After the siege of Atræ in Arabia was raised, Trajan, who had already given him the government of Syria, left him the command of the army: and at length, when he found death approaching, it is said he adopted him. Adrian, who was then in Antiochia, as soon as he received the news thereof, and of Trajan's death, declared himself emperor, on the 11th of August, A. D. 117.

No sooner had he arrived at the imperial dignity, than he made peace with the Persians, to whom he yielded up great part of the conquests of his predecessors; and from generosity, or policy, he remitted the debts of the Roman people, which, according to the calculation of those who have reduced them to modern money, amounted to 22,500,000 golden crowns; and he burnt all the bonds and obligations relating to these debts, that the people might be under no apprehension of being called to an account for them afterwards. There are medals in commemoration of this fact, in which he is represented holding a flambeau in his hand, to set fire to all those bonds which he had made void. He went to visit all the provinces; and did not return to Rome till the year 118, when the senate decreed him a triumph and honoured him with the title of *Father of his country*; but he refused both, and desired that Trajan's image might triumph. No prince travelled more than Adrian; there being hardly one province in the empire which he did not visit. In 120 he went into Gaul; from thence he went over to Britain, in order to subdue the Caledonians, who were making continual inroads into the provinces. Upon his arrival they retired towards the north: he advanced, however, as far as York, where he was diverted from his intended conquest by the description some old soldiers he found there, who had served under Agricola, gave him of the country. In hopes, therefore, of keeping them quiet by enlarging their bounds, he delivered up to the Caledonians all the lands lying between the two friths and the Tyne; and, at the same time, to secure the Roman province from their future incursions, built the famous wall which still bears his name (A). Having thus settled matters in Britain, he returned to Rome, where he was honoured with the title of Restorer of Britain, as appears by some medals. He soon after went into Spain, to Mauritania, and at length into the East, where he quieted the commotions raised by the Parthians. After having visited all the provinces of Asia, he returned to Athens in 125, where he passed the

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winter, and was initiated in the mysteries of Eleusinian Ceres. He went from thence to Sicily, chiefly to view Mount Ætna, contemplate its phenomena, and enjoy the beautiful and extensive prospect afforded from its top. He returned to Rome the beginning of the year 129; and, according to some, he went again, the same year, to Africa; and, after his return from thence, to the east. He was in Egypt in the year 132, revisited Syria the year following, returned to Athens in 134, and to Rome in 135. The persecution against the Christians was very violent under his reign; but it was at length suspended, in consequence of the remonstrances of Quadratus bishop of Athens, and Aristides, two Christian philosophers, who presented the emperor with some books in favour of the Christian religion. He conquered the Jews; and, by way of insult, erected a temple to Jupiter on Calvary, and placed a statue of Adonis in the manger of Bethlehem; he caused also the images of swine to be engraven on the gates of Jerusalem. At last he was seized with a dropsy, which vexed him to such a degree, that he became almost raving mad. A great number of physicians were sent for, and to the multitude of them he ascribed his death. He died at Baiæ in the 63d year of his age, having reigned 21 years. The Latin verses he addressed to his soul, which he composed a short time before his death, in a strain of tender levity, have been much criticised and have been the subject of numerous translations and imitations.

*Animula vagula, blandula,
Hospes, comesque corporis,
Quæ nunc abibis in loca
Pallidula, rigida, nudula,
Nec, ut soles, dabis jocos?*

Ah! fleeting spirit! wand'ring fire,
That long hast warm'd my tender breast,
Must thou no more this frame inspire?
No more a pleasing cheerful guest?
Whither, ah whither art thou flying?
To what dark undiscover'd shore?
Thou seem'st all trembling, shiv'ring, dying,
And wit and humour are no more!

POPE.

Some fragments of his Latin poetry are still extant, and there are Greek verses of his in the Anthology. He also wrote the history of his own life; to which, however, he did not choose to put his name; but that

B b

of

(A) This work, though called by the Roman historians *muris*, which signifies a wall of stone, was only composed of earth covered with green turf. It was carried on from the Solway frith, a little west of the village of Burgh on the Sands, in as direct a line as possible, to the river Tyne on the east, at the place where the town of Newcastle now stands; so that it must have been above 60 English, and near 70 Roman miles in length. It consisted of four parts: 1. The principal *agger*, mound of earth, or rampart, on the brink of the ditch. 2. The ditch on the north side of the rampart. 3. Another rampart on the south side of the principal one, about five paces distant from it. 4. A large rampart on the north side of the ditch.—This last was probably the military way to the line of forts on this work: it was so to those formerly built by Agricola; and if it did not serve the same purpose in this, there must have been no military way attending it.—The south rampart might serve for an inner defence in case the enemy should beat them from any part of the principal rampart, or it might be designed to protect the soldiers from any sudden attack of the provincial Britons.—For many ages, this work hath been in so ruinous a condition, that it is impossible to discover its original dimensions with certainty. From their appearance, it seems probable that the principal rampart was at least 10 or 12 feet high.

Adrian. of Phlegon, one of his freed-men, a very learned person, was prefixed to it*. He had great wit and a retentive memory, and he distinguished himself in the various branches of literature and science. In his natural disposition he was suspicious, envious, cruel, and lascivious. In his character there was a strange composition of virtues and vices. He was affable, courteous, and liberal; but he was capricious and unsteady in his attachments, and violent in his resentment. Thus he was distrusted by his friends, and dreaded by his enemies. Antoninus his successor obtained his apotheosis; and prevented the rescission of his acts, which the senate once intended.

*Vide Spartian, in Adrian

ADRIAN I. *Pope*, ascended the papal throne, A. D. 772. He was the son of Theodore, a Roman nobleman, and possessed considerable talents for business. He maintained a steady attachment to Charlemagne, which provoked Desiderius, king of the Lombards, to invade the state of Ravenna, and to threaten Rome itself. Charlemagne rewarded his attachment, by marching with a great army to his aid; and having gained many considerable advantages over Desiderius, he visited the pope at Rome, and expressed his piety, by the humiliating ceremony of kissing each of the steps, as he ascended to the church of St Peter. The affairs of the church now claimed Adrian's particular attention: for Irene, who, in 780, assumed the regency at Constantinople, during the minority of her son Constantine, wishing to restore the worship of images, applied to Adrian for his concurrence. The pontiff readily acquiesced in her proposal for calling a council, and commissioned two legates to attend it. The first council, however, was dispersed by an insurrection of the citizens, but at the next meeting in the city of Nice, in 787, which was protected by a military force, a decree was passed for restoring the worship of images. Adrian approved the decree, but in the western church it was deemed heretical and dangerous. Charlemagne condemned the innovation, and the French and English clergy concurred in opposing it. A treatise, containing 120 heads of refutation, was circulated, as the work of Charlemagne, under the title of "The Caroline Books," in opposition to the decree of the council. This work was presented to the pope by the king's ambassador, and the pope wrote a letter to Charlemagne by way of reply. The king, and also the Gallican and English churches, retained their sentiments; and, in 794, a council was held at Frankfort on the Maine, consisting of about 300 western bishops, by which every kind of image-worship was condemned. Adrian did not live to see a termination of this contest; for after a pontificate of nearly twenty-four years, he died in 795. Adrian seems to have directed his chief attention to the embellishment of the churches, and the improvement of the city of Rome; and he was probably furnished by Charlemagne, out of the plunder of his conquests, with ample means for this purpose.

ADRIAN II. *Pope*, succeeded Nicholas I. A. D.

867. Having twice refused the dignity, he accepted it in the 76th year of his age, at the united request of the clergy, nobility, and people. The contest for power between the Greek and Latin churches had been very violent some years before his accession to the papal chair.

Adrian.

Adrian, during this contest with the eastern patriarch, was extending his authority over the kings and princes of the west. He employed his whole interest to induce Charles the Bald, who had taken possession of the kingdom of Lorraine, and who had been crowned at Rheims by the archbishop Hincmar, to relinquish it in favour of the emperor; and he even sent legates to the king, after having attempted to engage Hincmar, the clergy, and the nobility to desert him, ordering him to surrender to the emperor's right. The king was invincible; and the pope was obliged to give up the contest. He also farther interfered in the concerns of princes, by taking Charles's rebellious son Carloman, and the younger Hincmar, bishop of Laon, under the protection of the Roman see. He proceeded in this business so far, that he was under a necessity of submitting without gaining his point. Death terminated his ambitious projects and his life of inquietude, A. D. 872, after a pontificate of five years.

ADRIAN IV. *Pope*, the only Englishman who ever had the honour of sitting in the papal chair. His name was Nicholas Brekelespere; and he was born at Langley, near St Alban's, in Hertfordshire. His father having left his family, and taken the habit of the monastery of St Alban's, Nicholas was obliged to submit to the lowest offices in that house for daily support. After some time, he desired to take the habit in that monastery, but was rejected by the Abbot Richard. Upon this he resolved to try his fortune in another country, and accordingly went to Paris; where, though in very poor circumstances, he applied himself to his studies with great assiduity, and made a wonderful proficiency. But having still a strong inclination to a religious life, he left Paris, and removed to Provence; where he became a regular clerk in the monastery of St Rufus. He was not immediately allowed to take the habit; but passed some time, by way of trial, in recommending himself to the monks by a strict attention to all their commands. This behaviour, together with the beauty of his person, and prudent conversation, rendered him so acceptable to those religious, that after some time they entreated him to take the habit of the canonical order. Here he distinguished himself so much by his learning and strict observance of the monastic discipline, that upon the death of the abbot, he was chosen superior of that house; and we are told that he rebuilt the convent. Pope Eugenius III. being apprised of the great merit of Nicholas, and thinking he might be servicable to the church in a higher station, created him cardinal-bishop of Alba in 1146. In 1148, his holiness sent him legate to Denmark and Norway; where, by his fervent preach-

high, and the south one not much less; but the north one was considerably lower. From the dimensions of the ditch taken as it passes through a lime-stone quarry near Harlow hill, it appears to have been 9 feet deep, and 11 wide at the top, but somewhat narrower at the bottom. The north rampart was about 20 feet distant from the ditch.

Adrian.

ing and diligent instructions, he converted those barbarous nations to the Christian faith, and erected Upsal into an archiepiscopal see. When he returned to Rome, he was received by the pope and cardinals with great marks of honour; and Pope Anastasius, who succeeded Eugenius, happening to die at this time, Nicholas was unanimously chosen to the holy see, in November 1154, and he took the name of *Adrian*. When the news of his promotion reached England, King Henry II. sent Robert abbot of St Alban's, and three bishops, to Rome, to congratulate him on his election; upon which occasion Adrian granted very considerable privileges to the monastery of St Alban's, particularly an exemption from all episcopal jurisdiction, excepting to the see of Rome. Adrian, in the beginning of his pontificate, boldly withstood the attempts of the Roman people to recover their ancient liberty under the consuls, and obliged those magistrates to abdicate their authority, and leave the government of the city to the pope. In 1155, he drove the heretic Arnaud of Bresse, and his followers, out of Rome. The same year he excommunicated William king of Sicily, who ravaged the territories of the church, and absolved that prince's subjects from their allegiance. About the same time, Frederick king of the Romans, having entered Italy with a powerful army, Adrian met him near Sutrium, and concluded a peace with him. At this interview, Frederic consented to hold the pope's stirrup whilst he mounted on horseback. After which, his holiness conducted that prince to Rome, and in St Peter's church placed the imperial crown on his head, to the great mortification of the Roman people, who assembled in a tumultuous manner, and killed several of the Imperialists. The next year a reconciliation was brought about between the pope and the Sicilian king, that prince taking an oath to do nothing farther to the prejudice of the church, and Adrian granting him the title of *King of the two Sicilies*. He built and fortified several castles, and left the papal dominions in a more flourishing condition than he found them. But notwithstanding all his successes, he was extremely sensible of the inquietudes attending so high a station; and declared to his countryman John of Salisbury, that all the former hardships of his life were mere amusement to the misfortunes of the popedom; that he looked upon St Peter's chair to be the most uneasy seat in the world; and that his crown seemed to be clapped burning on his head*. He died September 1. 1159, in the fourth year and tenth month of his pontificate; and was buried in St Peter's church, near the tomb of his predecessor Eugenius. There are extant several letters, and some homilies, written by Pope Adrian.

* *Baronius Anal. tom. xii. an. 1154.*

ADRIAN V. *Pope*, a Genoese, whose name was Ottoboni Fiesci, succeeded Innocent V. A. D. 1276. He was by his uncle Innocent IV. created cardinal deacon of St Adrian, and in 1254 sent by him to England, to settle the disputes between Henry III. and his barons. He was employed again for the same purpose, by Clement III. when he issued a sentence of excommunication against the king's enemies. When he was congratulated on his accession to the papal chair, he said, "I wish you had found me a healthy cardinal, rather than a dying pope." After his election he went to Viterbo to meet the emperor Rodolphus, for

the purpose of opposing the usurpation of Charles, king of the Two Sicilies; but died soon after his arrival, having enjoyed his dignity only thirty-eight days. He zealously encouraged the crusade to the Holy Land, and upon his election sent a large sum to Constantinople towards building galleys.

Adrian, Adriani.

ADRIAN, cardinal priest, of the title of St Chryzogonus, was a native of Cornetto in Tuscany. Innocent VIII. sent him nuncio into Scotland and into France; and after he had been clerk and treasurer of the apostolic chamber, Pope Alexander VI. whose secretary he had been, honoured him with the cardinal's hat. His life was a continued scene of odd alterations. He narrowly escaped death the day Alexander VI. poisoned himself by mistake. Afterward he drew upon himself the hatred of Julius II. so that he was obliged to go and hide himself in the mountains of Trent. Having been recalled by Leo X. he was so ungrateful, that he engaged in a conspiracy against him. The pope pardoned his fault; but the cardinal, not caring to trust to this, made his escape, and it could never be known exactly what was become of him. He was one of the first who effectually reformed the Latin style. He studied Cicero with great success, and made many excellent observations on the propriety of the Latin tongue. The treatise he composed *De Sermone Latino*, is a proof of this. He had begun a Latin translation of the Old Testament. He wrote *De Vera Philosophia*: This treatise was printed at Cologne 1548.

ADRIAN VI. *Pope*, was born at Utrecht in 1459. His father was not able to maintain him at school, but he got a place at Louvain, in a college in which a certain number of scholars were maintained *gratis*. It is reported that he used to read in the night time by the light of the lamps in the churches or streets. He made a considerable progress in all the sciences; led an exemplary life; and there never was a man less intriguing and forward than he was. He took his degree of doctor of divinity at Louvain; was soon after made canon of St Peter's, and professor of divinity at Utrecht, and then dean of St Peter's and vice-chancellor of the university. He was obliged to leave an academical life, to be tutor to the archduke Charles. This young prince made no great progress under him: however, never was a tutor more considerably rewarded; for it was by Charles V.'s credit he was raised to the papal throne. Leo X. had given him the cardinal's hat in 1517. After this pope's death, several cabals in the conclave ended in the election of Adrian, with which the people of Rome were very much displeas'd. He would not change his name, and in every thing he showed a great dislike for all ostentation and sensual pleasures, though such an aversion had been long ago out of date. He was very partial to Charles V. and did not enjoy much tranquillity under the triple crown. He lamented much the wicked morals of the clergy, and wished to establish a reformation of manners among them. He died September 14. 1523.

ADRIANI, JOANNI BATTISTA, was born of a patrician family at Florence in 1511. He wrote a History of his own Times in Italian; which is a continuation of Guicciardini, beginning at the year 1536; to which Thuanus acknowledges himself greatly indebted: besides which, he composed six funeral ora-

Adrianists
||
Adrianum.

tions, on the emperor Charles V. and other noble personages; and is thought to have been the author of a long letter on ancient painters and sculptors, prefixed to the third volume of Vafari. He died at Florence in 1579.

ADRIANISTS, in *Ecclesiastical History*, a sect of heretics divided into two branches, the first were disciples of Simon Magus, and flourished about the year 34. Theodoret is the only person who has preserved their name and memory; but he gives us no account of their origin. Probably this sect, and the six others which sprung from the Simonians, took their name from the particular disciples of Simon. The second were the followers of Adrian Hamstead the anabaptist; and held some particular errors concerning Christ.

ADRIANOPOLE, a city of Turkey in Europe, in the province of Romania, and the see of an archbishop under the patriarch of Constantinople. It is about seven or eight miles in circumference, including the old city and some gardens. The houses are low, mostly built of mud and clay, and some of brick: and the streets are exceedingly dirty. The walls and towers are in a great measure fallen to decay. However, there is a beautiful bazar, or market, half a mile long, called Ali Bassa. It is a vast arched building, with six gates, and 365 well furnished shops, kept by Turks, Armenians, and Jews, who pay five crowns a-month for each shop. The number of inhabitants of all nations and religions may be about 100,000; but it is dear living here, because the provisions are brought from distant places. The air is wholesome, and the country very pleasant in the summer time, on account of the river and streams that run near and about the city; the chief of which is the Mariza. These promote and preserve the verdure of the gardens, meadows, and fields, for a considerable part of the year. In the winter there is plenty of game. Near the principal bazar there is another, about a mile in length, covered with boards, with holes on each side to let in the light. It is full of good shops, which contain all kinds of commodities. Sultan Selim's mosque stands on the side of a hill, in the midst of the city; and hence this magnificent structure may be seen on all sides. Every thing made of gold and silver, jewels, pistols, scimitars, &c. are sold in another part of the city, called by travellers the *biszstein*, though it differs little from a bazar. This contains about 200 shops, and is covered like the former: but the covering is supported by two rows of large pillars. The grand vizier's palace is nothing more than a convenient house, after the Turkish manner of building. The emperor's seraglio is a regular structure, in a plain near the river Tungia. It is two miles in compass, and has seven gates, besides those of the gardens, which are several miles in circumference. The city is governed by a mullah cadi, who has an absolute authority both in civil and criminal matters. In the time of the plague, or war, the grand signior sometimes resides here. The Turks took this city from the Greeks in 1362, and made it the capital of empire, till Mahomet II. took Constantinople in 1453. E. Long. 26. 27. N. Lat. 41. 41.

ADRIANUM (OR ADRIATICUM) MARE, in *Ancient Geography*, now the gulf of Venice, a large bay in the Mediterranean, between Dalmatia, Sclavonia, Greece, and Italy. It is called by the Greeks *Adriacos*

Kolpos; and *Adria* by the Romans, (as *Arbiter Adriæ* Adrogation; *Notus*, Hor.) Cicero calls it *Hadrianum Mare*; Virgil has *Hadriaticas Undas*. It is commonly called *Mare Adriaticum*, without an aspiration; but whether it ought to have one, is a dispute: if the appellation is from *Hadria*, the town of the Piceni, it must be written *Hadriaticum*, because the emperor's name, who thence derives his origin, is on coins and stones *Hadrianus*; but if from the town in the territory of Venice, as the more ancient, and of which that of the Piceni is a colony, this will justify the common appellation *Adriaticum*.

ADROGATION, in *Roman Antiquities*, a species of adoption, whereby a person who was capable of choosing for himself was admitted by another into the relation of a son. The word is compounded of *ad*, "to," and *rogare*, "to ask;" on account of a question put in the ceremony of it, Whether the adopter would take such a person for his son? and another to the adoptive, Whether he consented to become such a person's son?

ADSIDELLA, in *Antiquity*, the table at which the flames sat during the sacrifices.

ADSTRICTION, among *Physicians*, a term used to denote the rigidity of any part.

ADUACA, or *ΑΤΥΑΚΑ*, anciently a large and famous city of the Tungri; now a small and inconsiderable village, called *Tongerren*, in the bishopric of Liege, to the north-west of the city of Liege, in the territory of Haspengow, on the rivulet Jecker, that soon after falls into the Maese. E. Long. 5. 52. N. Lat. 50. 54.

ADVANCE, in the *mercantile* style, denotes money paid before goods are delivered, work done, or business performed.

ADVANCED, in a general sense, denotes something posted or situated before another. Thus,

ADVANCED Ditch, in *Fortification*, is that which surrounds the glacis or esplanade of a place.

ADVANCED Guard, or *Vanguard*, in the art of war, the first line or division of an army, ranged or marching in order of battle; or, it is that part which is next the enemy, and marches first towards them.

ADVANCED Guard, is more particularly used for a small party of horse stationed before the main guard.

ADVANCER, among sportsmen, one of the starts or branches of a buck's attire, between the back antler and the palm.

ADUAR, in the Arabian and Moorish customs, a kind of ambulatory village, consisting of tents, which these people remove from one place to another, as suits their conveniency.

ADVENT, in the calendar, properly signifies the approach of the feast of the nativity. It includes four Sundays, which begins on St Andrew's day, or on the Sunday before or after it. During advent, and to the end of the octaves of epiphany, the solemnizing of marriage is forbidden without a special license. It is appointed to employ the thoughts of Christians on the first advent or coming of Christ in the flesh, and his second advent or coming to judge the world. The primitive Christians practised great austerity during this season.

ADVENTREMINSPICIENDUM, in *Law*, a writ by which a woman is to be searched whether she be with child
by

Adventure. by a former husband, on her withholding of lands from the next, failing issue of her own body.

ADVENTURE, in a general sense, some extraordinary or accidental event. It also denotes a hazardous or difficult undertaking.

Bill of ADVENTURE, among *Merchants*, a writing signed by a merchant, testifying the goods mentioned in it to be shipped on board a certain vessel belonging to another person, who is to run all hazards; the merchant only obliging himself to account to him for the produce.

ADVENTURE Bay, in Van Diemen's land. "There is a beautiful sandy beach, about two miles long, at the bottom of Adventure Bay, formed to all appearance by the particles which the sea washes from a fine white sand-stone. This beach is very well adapted for hauling a seine. Behind it is a plain, with a brackish lake, out of which we caught, by angling, some bream and trout. The parts adjoining the bay are mostly hilly, and are an entire forest of tall trees, rendered almost impassable by brakes of fern, shrubs, &c. The soil on the flat land, and on the lower part of the hills, is sandy or consists of a yellowish earth, and in some parts of a reddish clay; but further up the hills, it is of a gray tough cast. This country, upon the whole, bears many marks of being very dry, and the heat appears to be great. No mineral bodies, nor stones of any other kind than the white sand-stone, were observed by us; nor could we find any vegetables that afforded subsistence for man. The forest trees are all of one kind, and generally quite straight: they bear clusters of small white flowers. The principal plants observed, are wood-forrel, milkwort, cudweed, bell-flower, gladiolus, samphire, and several kinds of fern; the only quadruped, a species of opossum, about twice the size of a large rat. The kangaroo, found further northward in New Holland, may also be supposed to inhabit here, as some of the inhabitants had pieces of the skin of that animal.

"The principal sorts of birds in the woods are brown hawks or eagles, crows, large pigeons, yellowish parquets, and a species which they called *instavilla cyanea*, from the beautiful azure colour of its head and neck. On the shore were several gulls, black oyster-catchers, or sea pies, and plovers of a stone colour.

"The inhabitants seemed mild and cheerful, with little of that wild appearance that savages in general have. They are almost totally devoid of personal activity or genius, and are nearly upon a par with the wretched natives of Terra del Fuegø. They display, however, some contrivance in their method of cutting their arms and bodies in lines of different directions, raised above the surface of the skin. Their indifference for presents, their general inattention, and want of curiosity, were very remarkable, and testified no acuteness of understanding. Their complexion is a dull black, which they sometimes heighten by smutting their bodies, as was supposed, from their leaving a mark behind on any clean substance. Their hair is perfectly woolly, and is clotted with grease and red ochre, like that of the Hottentots. Their noses are broad and full, and the lower part of the face projects considerably. Their eyes are of a moderate size, and though they are not very quick or piercing, they give the countenance a frank, cheerful, and pleasing cast.

Their teeth are not very white, nor well set, and their mouths are too wide: they wear their beards long, and clotted with paint. They are, upon the whole, well proportioned, though their belly is rather protuberant. Their favourite attitude is to stand with one side forward, and one hand grasping, across the back, the opposite arm, which on this occasion, hangs down by the side that projects." *Cooke's Voyages*.

ADVENTURER, in a general sense, denotes one who hazards something.

ADVENTURERS, is particularly used for an ancient company of merchants and traders, erected for the discovery of lands, territories, trades, &c. unknown. The society of adventurers had its rise in Burgundy, and its first establishment from John duke of Brabant in 1248, being known by the name of *The brotherhood of St Thomas à Becket*. It was afterwards translated into England, and successively confirmed by Edward III. and IV. Richard III. Henry IV. V. VI. and VII. who gave it the appellation of *Merchant Adventurers*.

ADVERB, in *Grammar*, a particle joined to a verb, adjective, or participle, to explain their manner of acting or suffering; or to mark some circumstance or quality signified by them. The word is formed from the preposition *ad*, "to," and *verbum*, "a verb;" and signifies literally a word joined to a verb, to show how, when, or where, one is, does, or suffers; as, the boy paints *neatly*, writes *ill*; the house stands *there*, &c. See GRAMMAR.

ADVERSARIA, among the ancients, a book of accounts, not unlike our journals, or day books. It is more particularly used for a kind of common-place book. See COMMON-PLACE BOOK.

ADVERSATIVE, in *Grammar*, a word expressing some difference between what goes before and what follows it. Thus, in the phrase, *he is an honest man, but a great enthusiast*, the word *but* is an adversative conjunction.

ADVERSATOR, in *Antiquity*, a servant who attended the rich in returning from supper, to give them notice of any obstacles in the way, at which they might be apt to stumble.

ADVERTISEMENT, in a general sense, denotes any information given to persons interested in an affair; and is more particularly used for a brief account of an affair inserted in the public papers, for the information of all concerned.

ADULA, in *Ancient Geography*, a mountain in Rhætia, or the country of the Grisons, part of the Alps, in which are the fountains of the Rhine; now *St Gothards*.

ADULE, or ADULIS, in *Ancient Geography*, a town of Egypt built by fugitive slaves, distant from its port on the Red sea 20 stadia. Pliny calls the inhabitants *Adulitæ*. The epithet is either *Adulitanus*; as, *Monumentum Adulitanum*, on the pompous inscription of the statue of Ptolemy Euergetes, published by Leo Alatus at Rome in 1631, and to be found in Spon and Thevenot: or, *Adulicus*; as, *Adulicus Sinus*, a part of the Red sea.

ADULT, an appellation given to any thing that is arrived at maturity: Thus we say, an adult person, an adult plant, &c. Among civilians, it denotes a youth between 14 and 25 years of age.

ADULTERER,

Adventurer
Adult.

Adulterer ADULTERER, a man who commits adultery. See ADULTERY.

Adulterine. ADULTERESS, a woman guilty of ADULTERY. An adulteress, by our law, undergoes no temporal punishment whatever, except the loss of her dower; and she does not lose even that, if her husband is weak enough to be reconciled to her, and cohabit with her after the offence committed. 13 Ed. I. cap. 34.

But it is to be observed, that adulteresses are such either by the canon or civil law. According to the former, a woman is an adulteress who, either being herself married, converses carnally with another man; or being single herself, converses with a man that is married. According to the latter, she is not an adulteress, if she be not herself in the married state, though she converses with a man that is. The crime, in this case, was more properly called *stuprum* than *adulterium*. Hence, among the Romans the word *adultera*, "adulteress," differed from *pellex*, which denoted a single woman who cohabited with a married man: and *pellex* differed from *concubina*, which signified her who had only intercourse with an unmarried man. The former was reputed infamous, and the latter innocent.

ADULTERATION, the act of debasing, by an improper mixture, something that was pure and genuine.

The word is Latin, formed of the verb *adulterare*, "to corrupt," by mingling something foreign to any substance. We have laws against the adulteration of coffee, tea, tobacco, snuff, wine, beer, bread, wax, hairpowder, &c.

ADULTERATION of coin, properly imports the making or casting of a wrong metal, or with too base or too much alloy.

Adulterations of coins are effected divers ways: as, by forging another stamp or inscription; by mixing impure metals with the gold or silver: most properly, by making use of a wrong metal, or an undue alloy, or too great an admixture of the baser metals with gold or silver. Counterfeiting the stamp, or clipping and lessening the weight, do not so properly come under the denomination of *adulterating*.—Evelyn gives rules and methods, both of adulterating and detecting adulterated metals, &c.—*Adulterating* is somewhat less extensive than *debasing*, which includes diminishing, clipping, &c.

To adulterate or debase the current coin, is a capital crime in all nations.—The ancients punished it with great severity: among the Egyptians both hands were cut off: and by the civil law, the offender was thrown to wild beasts. The emperor Tacitus enacted, That counterfeiting the coin should be capital; and under Constantine it was made treason, as it is also among us. The adulterating of gems is a curious art, and the methods of detecting it no less useful. Nichols Lapid. p. 18.

ADULTERINE, in the *Civil Law*, is particularly applied to a child issued from an adulterous amour or commerce. Adulterine children are more odious than the illegitimate offspring of single persons.—The Roman law even refuses them the title of natural children; as if nature disowned them.—Adulterine children are not easily dispensed with for admission to orders. Those are not deemed adulterine, who are begotten of a woman openly married, through ignorance of a former

wife being alive.—By a decree of the parliament of Paris, adulterine children are declared not legitimated by the subsequent marriage of the parties, even though a papal dispensation be had for such marriage, wherein is a clause of legitimation.

ADULTERINE Marriages, in St Augustine's sense, denote second marriages, contracted after a divorce.

ADULTERY, an unlawful commerce between one married person and another, or between a married and unmarried person.

Punishments have been annexed to adultery in most ages and nations, though of different degrees of severity. In many it has been capital; in others venial, and attended only with slight pecuniary mulcts. Some of the penalties are serious, and even cruel; others of a jocose and humorous kind. Even contrary things have been enacted as punishments for adultery. By some laws, the criminals are forbidden marrying together, in case they became single; by others, they are forbidden to marry any besides each other; by some, they are incapacitated from ever committing the like crime again; by others, they are glutted with it till it becomes downright nauseous.

Among the rich Greeks, adulterers were allowed to redeem themselves by a pecuniary fine; the woman's father, in such cases, returned the dower he had received from her husband, which some think was refunded by the adulterer. Another punishment among those people was, putting out the eyes of adulterers.

The Athenians had an extraordinary way of punishing adulterers, called *παράλιμος αναφαιρωδωσις*, practised at least on the poorer sort who were not able to pay the fines. This was an awkward sort of empalement, performed by thrusting one of the largest radishes up the anus of the adulterer, or, in defect thereof, a fish with a large head, called *mugil*, "mullet." Alcæus is said to have died this way, though it is doubted whether the punishment was reputed mortal. Juvenal and Catullus speak of this custom as received also among the Romans, though not authorized by an express law, as it was among the Greeks.

There are various conjectures concerning the ancient punishment of adultery among the Romans. Some will have it to have been made capital by a law of Romulus, and again by the twelve tables. Others, that it was first made capital by Augustus; and others, not before the emperor Constantine. The truth is, the punishment in the early days was very various, much being left to the discretion of the husband and parents of the adulterous wife, who exercised it differently, rather with the silence and countenance of the magistrate than any formal authority from him. Thus we are told, the wife's father was allowed to kill both parties, when caught in the fact, provided he did it immediately, killed both together, and as it were with one blow. The same power ordinarily was not indulged the husband, except the crime were committed with some mean or infamous person; though, in other cases, if his rage carried him to put them to death, he was not punished as a murderer. On many occasions, however, revenge was not carried so far; but mutilating, castrating, cutting off the ears, noses, &c. served the turn. The punishment allotted by the *lex Julia*, was not, as many have imagined, death; but rather banishment, or deportation, being interdicted fire and water: though

Adultery. Octavius appears, in several instances, to have gone beyond his own law, and to have put adulterers to death. Under Macrinus, many were burnt at a stake. Constantine first by law made the crime capital. Under Constantius and Constans, adulterers were burnt, or sewed in sacks and thrown into the sea. Under Leo and Marcian, the penalty was abated to perpetual banishment, or cutting off the nose. Under Justinian, a farther mitigation was granted, at least in favour of the wife, who was only to be scourged, lose her dower, and be shut up in a monastery: after two years, the husband was at liberty to take her back again; if he refused, she was shaven, and made a nun for life: But it still remained death in the husband. The reason alleged for this difference is, that the woman is the weaker vessel. Matthæus declaims against the empress Theodora, who is supposed to have been the cause of this law, as well as of others procured in favour of that sex from the emperor.

Under Theodosius, women convicted of this crime were punished after a very singular manner, viz. by a public constupration; being locked up in a narrow cell, and forced to admit to their embraces all the men that would offer themselves. To this end, the gallants were to dress themselves on purpose, having several little bells fastened to their clothes, the tinkling of which gave notice to those without of every motion. This custom was again abolished by the same prince.

By the Jewish law, adultery was punished by death in both parties, where they were both married, or only the woman. The Jews had a particular method of trying, or rather purging, an adulteress, or a woman suspected of the crime, by making her drink the bitter waters of jealousy; which, if she were guilty, made her swell.

Among the Mingrelians, according to Chardin, adultery is punished with the forfeiture of a hog, which is usually eaten in good friendship between the gallant, the adulteress, and the cuckold. In some parts of the Indies, it is said any man's wife is permitted to prostitute herself to him who will give an elephant for the use of her; and it is reputed no small glory to her to have been rated so high. Adultery is said to be so frequent at Ceylon, that not a woman but practises it, notwithstanding its being punishable with death. Among the Japanese, and divers other nations, adultery is only penal in the woman. Among the Abyssinians, the crime of the husband is said to be only punished on the innocent wife. In the Marian islands, on the contrary, the woman is not punishable for adultery; but if the man go astray he pays severely: the wife and her relations waste his lands, turn him out of his house, &c. Among the Chinese, there is reason to conclude that adultery is not capital; for it is said that fond parents will make a contract with their daughters future husbands to allow them the indulgence of a gallant.

In Spain, they punished adultery in men by cutting off that part which had been the instrument of the crime. In Poland, before Christianity was established, they punished adultery and fornication in a very particular manner: the criminal they carried to the market-place, and there fastened him by the testicles with a nail; laying a razor within his reach, and leaving him under a necessity, either of doing justice upon himself, or of perishing in that condition.

The Saxons formerly burnt the adulteress, and over her ashes erected a gibbet, whereon the adulterer was hanged. In this kingdom, likewise, adultery, by the ancient laws, was severely punished. King Edmund the Saxon ordered adultery to be punished in the same manner as homicide; and Canute the Dane ordered that a man who committed adultery should be banished, and that the woman should have her nose and ears cut off. In the time of Henry I. it was punished with the loss of eyes and genitals.

In Britain, adultery is reckoned a spiritual offence, that is, cognizable by the spiritual courts, where it is punished by fine and penance. The common law takes no farther notice of it, than to allow the party grieved an action and damages. This practice is often censured by foreigners, as making too light of a crime, the bad consequences of which, public as well as private, are so great. It has been answered, that perhaps this penalty, by civil action, is more wisely calculated to prevent the frequency of the offence, which ought to be the end of all laws, than a severer punishment. He that by a judgment of law is, according to circumstances, stripped of great part of his fortune, thrown into prison till he can pay it, or forced to fly his country, will, no doubt, in most cases, own that he pays dearly for his amusement.

As to the moral turpitude of this offence, some have vainly endeavoured to deny or explain it away by various arguments, and even by an appeal to Scripture. On the part of the *man* who solicits the chastity of a married woman, it certainly includes the crime of **SEDUCTION**, and is attended with mischief still more complicated and extensive: It creates a new sufferer, the injured husband, upon whose simplicity and affection is inflicted a wound the most painful and incurable that human nature knows. The infidelity of the *woman* is aggravated by cruelty to her children, who are generally involved in their parents' shame, and always made unhappy by their quarrel.

It has been argued, that these consequences ought less to be attributed to the crime than to the discovery. But, in the first place, the crime could not be discovered unless it were committed, and the commission is never secure from discovery. *2^{dly}*, If adulterous connections were allowable whenever the parties could hope to escape detection, which is the conclusion to which this argument leads, the husband would be left no other security for his wife's chastity, than in her want of opportunity or temptation; which would probably deter most men from marrying; or render marriage a state of continual jealousy and alarm to the husband, which would end in the slavery and confinement of the wife.

The marriage vow is "witnessed before God," and accompanied with circumstances of solemnity and religion which approach to the nature of an oath. The married offender, therefore, incurs a crime little short of perjury, and the seduction of a married woman is little less than subornation of perjury:—and this guilt is independent of the discovery.

But the usual apology for adultery is the prior transgression of the other party; and so far, indeed, as the bad effects of adultery are anticipated by the conduct of the husband or wife who offends first, the guilt of the second offender is extenuated. But this can never amount

Adultery. amount to a justification; unless it could be shown that the obligation of the marriage vow depends upon the condition of reciprocal fidelity; a construction which appears founded neither in expediency, nor in the terms of the vow, nor in the design of the legislature which prescribed the marriage rite. The way of considering the offence upon the footing of *provocation and retaliation*, is a childish trifling with words.

"Thou shalt not commit adultery," was an interdiction delivered by God himself; yet Scripture has been adduced as giving countenance to the crime. As Christ told the woman taken in adultery, "Neither do I condemn thee," we must believe, it is said, that he deemed her conduct either not criminal, or at least not a crime of the heinous nature we represent it to be. But from a more attentive examination of the case, it will be evident that nothing can be concluded from it favourable to such an opinion. The transaction is thus related *

* St John's Gospel, chap. viii.

"Early in the morning Jesus came again into the temple, and all the people came unto him; and he sat down and taught them. And the Scribes and Pharisees brought unto him a woman taken in adultery; and when they had set her in the midst, they say unto him, Master, this woman was taken in adultery, in the very act. Now Moses in the law commanded us that such should be stoned, but what sayest thou? This they said, tempting him, that they might have to accuse him. But Jesus stooped down, and with his finger wrote on the ground, as though he heard them not. So when they continued asking him, he lifted up himself, and said unto them, He that is without sin amongst you, let him first cast a stone at her; and again he stooped down and wrote on the ground: and they which heard it, being convicted by their own conscience, went out one by one, beginning at the eldest, even unto the last; and Jesus was left alone, and the woman standing in the midst. When Jesus had lifted up himself, and saw none but the woman, he said unto her, Woman, where are those thine accusers? Hath no man condemned thee? She said, No man, Lord: and Jesus said unto her, Neither do I condemn thee; go and sin no more."

'This they said tempting him, that they might have to accuse him;' that is, to draw him into an exercise of judicial authority, that they might have to accuse him before the Roman governor of usurping or intermeddling with the civil government.

Paley's Moral and Political Philosophy, p. 258. 3d edit. 4to.

"This was their design; and Christ's behaviour throughout the whole affair proceeded from a knowledge of this design, and a determination to defeat it. He gives them at first a cold and sullen reception, well suited to the insidious intention with which they came: he stooped down, and with his finger wrote on the ground as though he heard them not." "When they continued asking him," when they teased him to speak, he dismissed them with a rebuke, which the impertinent malice of their errand, as well as the secret character of many of them, deserved: 'he that is without sin (that is, this sin) among you, let him first cast a stone at her.' This had its effect. Stung with the reproof, and disappointed of their aim, they stole away one by one, and left Jesus and the woman alone. And then follows the conversation, which is the part of the narrative most material to our present

subject. 'Jesus saith unto her, Woman, where are those thine accusers? Hath no man condemned thee?' 'She said, No man, Lord. And Jesus said unto her, 'Neither do I condemn thee; go and sin no more.' Now, when Christ asked the woman, 'Hath no man condemned thee?' he certainly spoke, and was understood by the woman to speak, of a legal and judicial condemnation; otherwise her answer, 'No man, Lord,' was not true. In every other sense of condemnation, as blame, censure, reproof, private judgment, and the like, many had condemned her; all those, indeed, who brought her to Jesus. If then a judicial sentence was what Christ meant by *condemning* in the question, the common use of language requires us to suppose that he meant the same in his reply, 'Neither do I condemn thee:' i. e. I pretend to no judicial character or authority over thee; it is no office or business of mine to pronounce or execute the sentence of the law. When Christ adds, 'Go and sin no more,' he in effect tells her that she had sinned already; but as to the degree or quality of the sin, or Christ's opinion concerning it, nothing is declared, or can be inferred, either way."

It has been controverted, whether adultery may be lawfully committed in war, with the enemies wives? The answer is in the negative, and the authorized practice of civilized nations is agreeable to this. It has also been a famous question, whether it be lawful for a woman to commit adultery with the consent of her husband, and for the procuring some great good to him? St Austin apparently allows of it; as least, does not condemn it *.

* De Serm. Dom. in Mont. lib. i. cap. 16. § 49. et De Civ. Dei, lib. xvi. cap. 25.

It has likewise been a dispute, whether it be lawful for one of the parties married to commit adultery, with the consent of the other, for the sake of having children? Of which we have instances in Abraham, who, on this account, conversed with Hagar; and likewise among the Greeks and Romans. Pollman, a German professor, has a dissertation on the husband's right to alienate his wife's body to another's use.

It is much disputed, whether adultery dissolves the bond of matrimony, and be a sufficient cause of divorce, so that the parties may marry again. This was allowed in the ancient church, and is still continued in the Greek, as well as the Lutheran and Calvinist churches. Romanists, however, disallow of it, and the council of Trent even anathematized those who maintain it; though the canon of anathematization was mitigated in deference to the republic of Venice, in some of whose dominions, as Zant, Cephalonia, &c. the contrary usage obtains. The ecclesiastical courts in England so far agree with the Papists, that they only grant a divorce *à mensa et thoro*, in case of adultery; so that a complete divorce, to enable the parties to marry again, cannot be had without an act of parliament.

ADULTERY is also used in ancient customs, for the punishment or fine imposed for that offence, or the privilege of prosecuting for it. In which sense, *adulterium* amounts to the same with what the Saxons call *legerwiva*.

ADULTERY is sometimes used, in a more extensive sense, for any species of impurity or crime against the virtue of chastity; and in this sense divines understand the seventh commandment.

ADULTERY

Adultery, Advocate. ADULTERY is also used, especially in *Scripture*, for idolatry, or departing from the true God to the worship of a false one.

ADULTERY is also used, in *Ecclesiastical Writers*, for a person's invading or intruding into a bishopric during the former bishop's life. The reason of the appellation is, that a bishop is supposed to contract a kind of spiritual marriage with his church. The translation of a bishop from one see to another was also reputed a species of adultery; on the supposition of its being a kind of second marriage, which, in those days, was esteemed a degree of adultery. This conclusion was founded on that text of St Paul, *Let a bishop be the husband of one wife*, by a forced construction of church for wife, and of bishop for husband. (Du Cange).

ADULTERY is also used by ancient *Naturalists*, for the act of ingrafting one plant upon another. In which sense, Pliny speaks of the adulteries of trees, *arborum adulteria*, which he represents as contrary to nature, and a piece of luxury, or needless refinement.

ADVOCATE, among the Romans, a person skilled in their law, who undertook the defence of causes at the bar. The Roman advocates answered to one part of the office of a barrister in England, viz. the pleading part; for they never gave counsel, that being the business of the *jurisconsulti*.

The Romans, in the first ages of their state, held the profession of an advocate in great honour; and the seats of their bar were crowded with senators and consuls; they, whose voices commanded the people, thinking it an honour to be employed in defending them. They were styled *comites, honorati, clarissimi*, and even *patroni*; as if their clients were not less obliged to them than freed men to their masters. The bar was not at that time venal. Those who aspired to honours and offices took this way of gaining an interest in the people, and always pleaded *gratis*. But no sooner were luxury and corruption introduced into the commonwealth, than the bar became a sharer in them. Then it was that the senators let out their voices for pay, and zeal and eloquence were sold to the highest bidder. To put a stop to this abuse, the tribune Cincius procured a law to be passed, called from him *Lex Cincia*, whereby the advocates were forbid to take any money of their clients. It had before this been prohibited the advocates to take any presents or gratuities for their pleading. The emperor Augustus added a penalty to it: notwithstanding which, the advocates played their part so well, that the emperor Claudius thought it an extraordinary circumstance, when he obliged them not to take above eight great sesterces, which are equivalent to about 64l. sterling, for pleading each cause.

ADVOCATE is still used in countries and courts where the civil law obtains, for those who plead and defend the causes of clients trusted to them.

ADVOCATE of a city, in the German polity, a magistrate appointed in the emperor's name to administer justice.

ADVOCATE is more particularly used in *Church History*, for a person appointed to defend the rights and revenues of a church or religious house. The word *advocatus*, or *advowee*, is still retained for what we usually call the *patron*, or he who has the advowson, or right of presentation in his own name.

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Consistorial ADVOCATES; officers of the consistory at Rome, who plead in all oppositions to the disposal of benefices in that court: they are ten in number.

Elective ADVOCATES, those chosen by the abbot, bishop, or chapter; a particular license being had from the king or prince for that purpose. The elections were originally made in the presence of the count of the province.

Feudal ADVOCATES. These were of the military kind, who, to make them more zealous for the interest of the church, had lands granted them in fee, which they held of the church, and did homage, and took an oath of fidelity to the bishop or abbot. These were to lead the vassals of the church to war, not only in private quarrels of the church itself, but in military expeditions for the king's service, in which they were the standard-bearers of their churches.

Fiscal ADVOCATE, fisci advocatus, in *Roman Antiquity*, an officer of state under the Roman emperors, who pleaded in all causes wherein the *fiscus*, or private treasury, was concerned.

Judicial ADVOCATES, in the middle age, were those who from attending causes in the court of the *comes*, or count of the province, became judges themselves, and held courts of their vassals thrice a-year, under the name of the *tria placita generalia*. In consideration of this further service, they had a particular allowance of one third part of all fines, or mulcts, imposed on defaulters, &c. besides a proportion of diet for themselves and servants.

Matricular ADVOCATES, were the advocates of the mother or cathedral churches.

Military ADVOCATES, those appointed for the defence of the church, rather by arms and authority than by pleading and eloquence. These were introduced in the times of confusion, when every person was obliged to maintain his own property by force; bishops and abbots not being permitted to bear arms, and the scholastic or gowned advocates being equally unacquainted with them, recourse was had to knights, noblemen, soldiers, or even to princes.

Nominative ADVOCATES, those appointed by a king or pope. Sometimes the churches petitioned kings, &c. to appoint them an advocate: at other times this was done of their own accord. By some regulations, no person was capable of being elected advocate, unless he had an estate in land in the same county.

Regular ADVOCATES, those duly formed and qualified for their profession, by a proper course of study, the requisite oath, subscription, license, &c.

Subordinate ADVOCATES, those appointed by other superior ones, acting under them, and accountable to them. There were various reasons for the creation of these subordinate advocates; as, the superior quality of the principal advocate, his being detained in war, or being involved in other affairs; but chiefly the too great distance of some of the church lands, and their lying in the dominions of foreign princes.

Supreme or Sovereign ADVOCATES, were those who had the authority in chief; but acted by deputies or subordinate advocates. These were called also *principal, greater*, and sometimes *general* advocates. Such in many cases were kings, &c. when either they had been chosen advocates, or became such by being founders or endowers of churches. Princes had also

C c

another

Advocate, Advoca- tion. another title to advocateship, some of them pretending to be *advocati nati* of the churches within their dominions.

ADVOCATES, in the English courts, are more generally called *counsel*. See COUNSEL.

Faculty of ADVOCATES, in Scotland, a respectable body of lawyers, who plead in all causes before the courts of session, judiciary, and exchequer. They are also entitled to plead in the house of peers, and other supreme courts in England.

In the year 1660, the faculty founded a library upon a very extensive plan, suggested by that learned and eminent lawyer Sir George M'Kenzie of Rosehaugh, advocate to King Charles II. and King James VII. who enriched it with many valuable books. It has been daily increasing since that time, and now contains not only the best collection of law books in Europe, but a very large and select collection of books in all subjects. Besides, this library contains a great number of original manuscripts, and a vast variety of Jewish, Grecian, Roman, Scots, and English coins and medals.

A candidate for the office of an advocate undergoes three several trials: The first is in Latin, upon the civil law and Greek and Roman antiquities; the second, in English, upon the municipal law of Scotland; and, in the third, he is obliged to defend a Latin thesis, which is impugned by three members of the faculty. Immediately before putting on the gown, the candidate makes a short Latin speech to the lords, and then takes the oaths to the government and *de fidei*.

The faculty at present consists of above 200 members. As an advocate or lawyer is esteemed the gentlest profession in Scotland, many gentlemen of fortune take the degree of advocate, without having any intention of practising at the bar. This circumstance greatly increases their number, gives dignity to the profession and enriches their library and public fund. It is from this respectable body that all vacancies on the bench are generally supplied.

Lord ADVOCATE, or *King's Advocate*, one of the eight great officers of state in Scotland, who as such sit in parliament without election. He is the principal crown lawyer in Scotland. His business is to act as a public prosecutor, and to plead in all causes that concern the crown; but particularly in such as are of a criminal nature. The office of king's advocate is not very ancient: It seems to have been established about the beginning of the 16th century. Originally he had no power to prosecute crimes without the concurrence of a private party; but, in the year 1597, he was empowered to prosecute crimes at his own instance. He has the privilege of pleading in court with his hat on. This privilege was first granted to Sir Thomas Hope; who having three sons lords of session, it was thought indecent that the father should plead uncovered before the sons, who as judges sat covered.

BILL OF ADVOCATION, in *Scots Law*, a writing drawn up in the form of a petition; whereby a party, in an action before an inferior court, applies to the supreme court, or court of session, for calling the action from the inferior court before itself.

Letters of ADVOCATION, in *Scots Law*, the decree or warrant of the court of session upon cognizance of the

facts set forth in the bill, drawn up in the form of a summons, and passing under the signet, discharging the inferior judge and all others from further procedure in the cause, and advocating it to itself.

ADVOWEE, in *Ancient Customs and Law Books*, denotes the advocate of a church, religious house, or the like. There were advowees of cathedrals, abbeys, monasteries, &c. Thus, Charlemagne had the title of advowee of St Peter's; King Hugh, of St Riquier; and Bolandus mentions some letters of Pope Nicholas, by which he constituted King Edward the Confessor, and his successors, advowees of the monastery at Westminster, and of all the churches in England. These advowees were the guardians, protectors, and administrators of the temporal concerns of the churches, &c. and under their authority were passed all contracts which related to them. It appears also, from the most ancient charters, that the donations made to churches were conferred on the persons of the advowees. They always pleaded the causes of the churches in court, and distributed justice for them, in the places under their jurisdiction. They also commanded the forces furnished by their monasteries, &c. for the war; and even were their champions, and sometimes maintained duels for them.

This office is said to have been first introduced in the fourth century, in the time of Stilico; though the Benedictines do not fix its origin before the eighth century. By degrees, men of the first rank were brought into it, as it was found necessary either to defend with arms or to protect with power and authority. In some monasteries they were only called *conservators*; but these, without the name, had all the functions of advowees. There were also sometimes several sub-advowees, or sub-advocates, in each monastery, who officiated instead of the advowees themselves; which, however, proved the ruin of monasteries; those inferior officers running into great abuses.

Hence also, husbands, tutors, and every person in general, who took upon him the defence of another, were denominated *advowees*, or advocates. Hence several cities had their advowees; which were established long after the ecclesiastical ones, and doubtless from their example. Thus we read in history of the advowees of Augsburg, of Arras, &c.

The *vidames* assumed the quality of advowees; and hence it is, that several historians of the eighth century confound the two functions together. Hence also it is, that several secular lords in Germany bear mitres for their crests, as having anciently been advowees of the great churches.

Spelman distinguishes two kinds of ecclesiastical advowees.—The one, of causes or processes, *advocati causarum*; the other, of territory or lands, *advocati soli*. The former were nominated by the king, and were usually lawyers, who undertook to plead the causes of the monasteries. The other, which still subsist, and are sometimes called by their primitive name, *advowees*, though more usually *patrons*, were hereditary; as being the founders and endowers of churches, &c. or their heirs.

Women were sometimes advowees, *advocatiſſæ*. And, in effect, the canon law mentions some who had this title, and who had the same right of presentation, &c. in their churches which the advowees themselves had.

In

Advowson, In a stat. 25 Edw. III. we meet with *advowee paramount* for the highest patron; that is, the king.

ADVOWSON, or ADVOWZEN, in *Common Law*, signifies a right to present to a vacant benefice. Advowson is so called, because the right of presenting to the church was first gained by such as were founders, benefactors, or maintainers of the church.

Though the nomination of fit persons to officiate in every diocese was originally in the bishop, yet they were content to let the founders of churches have the nomination of the persons to the churches so founded, reserving to themselves a right to judge of the fitness of the persons nominated.

Advowsons formerly were most of them appendant to manors, and the patrons were parochial barons: the lordship of the manor and patronage of the church were seldom in different hands, until advowsons were given to religious houses. But of late times the lordship of the manor and advowson of the church have been divided.

Advowsons are *presentative*, *collative*, or *donative*: *presentative*, where the patron presents or offers his clerk to the bishop of the diocese, to be instituted in his church; *collative*, where the benefice is given by the bishop, as original patron thereof, or by means of a right he has acquired by lapse; *donative*, as where the king or other patron does, by a single donation in writing, put the clerk into possession, without presentation, institution, or induction.

Sometimes, anciently, the patron had the sole nomination of the prelate, abbot, or prior; either by investiture (i. e. delivery of a pastoral staff), or by direct presentation to the diocesan; and if a free election was left to the religious, yet a *congé d'elire*, or license of election, was first to be obtained of the patron, and the person elected was confirmed by him. If the founder's family became extinct, the patronage of the convent went to the lord of the manor. Unless the several colleges in the universities be restrained in the number of advowsons they may receive, it is argued they will in time acquire such a stock as to frustrate the design of their foundation (which is the education of youth), by creating too quick a succession of fellows; so that there will not be in the colleges a sufficient number of persons of competent age, knowledge, and experience, to instruct and form the minds of the youth. In some colleges the number of advowsons is said to be already two-thirds, or more, of the number of fellows. It is objected, on the other side, that the succession of fellows may be too slow as well as too quick; whereby persons well qualified may be detained so long in colleges as not to have strength or activity enough left for the discharge of parochial functions.

Colleges holding more advowsons in number than a moiety of the fellows, are not capable of purchasing more. Grants of advowsons by Papists are void. 9 Geo. II. c. 36. § 5. 11 Geo. II. c. 17. § 5.

Advowsons are temporal inheritances and lay fees; they may be granted by deed or will, and are assets in the hands of heirs or executors. Presentations to advowsons for money, or other reward, are void. 31 Eliz. cap. 6.

In Scotland, this right is called *patronage*. See PATRONAGE.

ADUST, ADUSTUS, among *Physicians*, &c. is ap-

plied to such humours as by long heat become of a hot and fiery nature. Such is cholera supposed to be. Melancholy is usually considered as black and adust bile. Blood is said to be adust, when, by reason of some extraordinary heat, its more subtle parts are all evaporated, leaving the grosser, with all the impurities therein, half torrefied.

ADY, in *Natural History*, a name given to the palm tree of the island of St Thomas. It is a tall tree with a thick, bare, upright stem, growing single on its root, of a thin light timber, and full of juice. The head of this tree shoots into a vast number of branches, which being cut off, or an incision being made therein, afford a great quantity of sweet juice, which fermenting supplies the place of wine among the Indians. The fruit of this tree is called by the Portuguese *caryoces* and *carioffe*; and by the black natives, *abanga*. This fruit is of the size and shape of a lemon; and contains a kernel, which is good to eat. The fruit itself is ate roasted, and the raw kernels are often mixed with mandioc meal. These kernels are supposed very cordial. An oil is also prepared from this fruit, which answers the purpose of oil or butter. This oil is also used for anointing stiff and contracted parts of the body.

ADYNAMIA, in *Medicine*, of a privative, and *δυναμις* strength, want of power, debility, or weakness, from sickness.

ADYNAMIÆ, the second class of Dr Cullen's nosological arrangement, which includes those diseases in which the involuntary motions, whether vital or natural, are diminished.

ADYNAMON, among *Ancient Physicians*, a kind of weak factitious wine, prepared from must boiled down with water; to be given to patients to whom genuine wine might be hurtful.

ADYTUM, in *Pagan Antiquity*, the most retired and sacred place of temples, into which none but the priests were allowed to enter. The *Sanctum Sanctorum* of the temple of Solomon was of the nature of the pagan adytum, none but the high priest being admitted into it, and he but once a-year.

ADZE, or ADDICE, a cutting tool of the axe kind; having its blade made thin and arching, and its edge at right angles to the handle; chiefly used for taking off thin chips of timber or boards, and for paring away certain irregularities which the axe cannot come at. The adze is used by carpenters, but more by coopers, as being convenient for cutting the hollow sides of boards, &c. It is ground from a base on its inside to its outer edge; so that, when it is blunt, they cannot conveniently grind it without taking its helve out of the eye.

ÆE, or Æ, a diphthong compounded of A and E. Authors are by no means agreed as to the use of the *æ* in English words. Some, out of regard to etymology, insist on its being retained in all words, particularly technical ones, borrowed from the Greek and Latin; while others, from a consideration that it is no proper diphthong in our language, its sound being no other than that of the simple, contend that it ought to be entirely disused; and, in fact, the simple *e* has of late been adopted instead of the Roman *æ*, as in the word *equator*, &c.

ÆACEA, in *Grecian Antiquity*, solemn festivals and games celebrated at Ægina, in honour of Æacus.

ÆACUS, the son of Jupiter by Ægina. When

Ady
||
Æacus.

Æbudaë
||
Ædile.

the isle of Ægina was depopulated by a plague, his father, in compassion to his grief, changed all the upon it into men and women, who were called *Myrmidones*, from *μυρμηξ*, an ant. The foundation of the fable is said to be, that when the country had been depopulated by pirates, who forced the few that remained to take shelter in caves, Æacus encouraged them to come out, and by commerce and industry recover what they had lost. His character for justice was such, that, in a time of universal drought, he was nominated by the Delphic oracle to intercede for Greece, and his prayer was answered. See the article ÆGINA. The Pagans also imagined that Æacus, on account of his impartial justice, was chosen by Pluto one of the three judges of the dead; and that it was his province to judge the Europeans.

ÆBUDÆ, a name anciently given to the Western islands of Scotland.

ÆBURA, in *Ancient Geography*, a town of Spain, in Estremadura, on the river Guadiana, to the west of Merida; now called *Talavera*. W. Long. 7. 15. N. Lat. 38. 40.

ÆCHMALOTARCHA, in *Jewish Antiquity*, a title given to the principal leader or governor of the Hebrew captives residing in Chaldea, Assyria, and the neighbouring countries. This magistrate was called by the Jews, *rosch-galath*, i. e. the chief of the captivity: but the above term, of like import in the Greek, is that used by Origen and others who wrote in the Greek tongue.

The Jewish writers assure us, that the *æchmalotarchæ* were only to be chosen out of the tribe of Judah. The eastern Jews had their princes of the captivity, as the western Jews their patriarchs. The Jews are still said to have an *æchmalotarcha* at Babylon, but without the authority of the ancient ones. (*Basnage Hist. Jews, and Prideaux's Connection.*)

ÆCIDIUM, in *Botany*. See *BOTANY Index*.

ÆCULANUM, in *Ancient Geography*, a town of the Hirpini in Italy, at the foot of the Apennines, to the east of Abellinum, contracted *Æclanum*, situated between Beneventum and Tarentum. The inhabitants are called *Æculani* by Pliny; and *Æclanenses*, in an ancient inscription (Gruter). The town is now called *Fricento*, (Cluverius), 43 miles east of Naples. E. Long. 15. 38. N. Lat. 41. 15.

ÆDES, in *Roman Antiquity*, besides its more ordinary signification of a house, likewise signified an inferior kind of temple, consecrated to some deity.

ÆDICULA, a term used to denote the inner part of the temple, where the altar and statue of the deity stood.

ÆDILATE, the office of ædile, sometimes called *Ædilité*. See the next article.

ÆDILE (*ædilis*), in *Roman Antiquity*, a magistrate whose chief business was to superintend buildings of all kinds, but more especially public ones, as temples, aqueducts, bridges, &c. To the ædiles likewise belonged the care of the highways, public places, weights and measures, &c. They also fixed the prices of provisions, took cognizance of debauches, punished lewd women, and such persons as frequented gaming houses. The custody of the plebiscita, or orders of the people, was likewise committed to them. They had the inspection of comedies and other pieces of wit; and were

obliged to exhibit magnificent games to the people, at their own expence, whereby many of them were ruined. To them also belonged the custody of the plebiscita, and the censure and examination of books. They had the power, on certain occasions, of issuing edicts; and, by degrees, they procured to themselves a considerable jurisdiction, the cognizance of various causes, &c. This office ruined numbers by its expensiveness; so that, in Augustus's time, even many senators declined it on that account.

All these functions which rendered the ædiles so considerable belonged at first to the ædiles of the people, *ædiles plebei*, or *minores*: these were only two in number, and were first created in the same year as the tribunes: for the tribunes, finding themselves oppressed with the multiplicity of affairs, demanded of the senate to have officers, to whom they might intrust matters of less importance: and accordingly two ædiles were created; and hence it was that the ædiles were elected every year at the same assembly as the tribunes. But these plebeian ædiles having refused, on a signal occasion, to treat the people with shows, as pleading themselves unable to support the expence thereof, the patricians made an offer to do it, provided they would admit them to the honours of the *ædilate*. On this occasion there were two new ædiles created, of the number of the patricians, in the year of Rome 388; they were called *ædiles curules*, or *maiores*; as having a right to sit on a curule chair, enriched with ivory, when they gave audience; whereas the plebeian ædiles only sat on benches.—Besides that the curule ædiles shared all the ordinary functions with the plebeian, their chief employ was, to procure the celebration of the grand Roman games, and to exhibit comedies, shows of gladiators, &c. to the people; and they were also appointed judges in all cases relating to the selling or exchanging estates.

To ease these four first ædiles, Cæsar created a new kind, called *ædiles cereales*, as being deputed chiefly to take care of the corn, which was called *donum Cereris*; for the Heathens honoured Ceres as the goddess who presided over corn, and attributed to her the invention of agriculture. These ædiles cereales were also taken out of the order of patricians. In the municipal cities there were ædiles, and with the same authority as at Rome.

We also read of an *ædilis alimentarius*, expressed in abbreviation by *Ædil. alim.* whose business seems to have been to provide diet for those who were maintained at the public charge, though others assign him a different office.—In an ancient inscription we also meet with *ædile* of the camp, *ædilis castrorum*.

ÆDILITIUM EDICTUM, among the Romans, was that whereby a remedy was given to a buyer in case a vicious or unsound beast, or slave, was sold to him. It was called *ædilitium*, because the preventing of frauds in sales and contracts belonged especially to the curule ædiles.

ÆDITUUS, in *Roman Antiquity*, an officer belonging to the temple, who had the charge of the offerings, treasure, and sacred utensils. The female deities had a female officer of this kind called *Ædiua*.

ÆGAGROPILA, a ball composed of hair, generated in the stomach of the chamois goat, which is similar to those found in cows, hogs, &c. There is another

Ædile
||
Ægagropila.

Ægæ
||
Ægilops.

another species of ball found in some animals, particularly horses, which is a calculous concretion.

ÆGÆ, or ÆGÆA, in *Ancient Geography*, the name of *Ædessa*, so called from the following adventure: Caranus, the first king of Macedonia, being ordered by the oracle to seek out a settlement in Macedonia, under the conduct of a flock of goats, surpris'd the town of *Ædessa*, during a thick fog and rainy weather, in following the goats that fled from the rain; which goats ever after, in all his military expeditions, he caused to precede his standard; and in memory of this he called *Ædessa Ægea*, and his people *Ægeade*. And hence probably, in the prophet Daniel, the he-goat is the symbol of the king of Macedon.

ÆGEAN SEA, in *Ancient Geography*, now the *Archipelago*, a part of the Mediterranean, separating Europe from Asia; washing, on the one hand, Greece and Macedonia; on the other, Caria and Ionia. The origin of the name is greatly disputed. Festus advances three opinions: one, that it is so called from the many islands therein, at a distance appearing like so many goats: another, because *Ægea* queen of the Amazons perished in it: a third opinion is, because *Ægeus*, the father of Theseus, threw himself headlong into it.

ÆGEUS, in *Fabulous History*, was king of Athens, and the father of Theseus. The Athenians having basely killed the son of Minos king of Crete, for carrying away the prize from them, Minos made war upon the Athenians; and being victorious, impos'd this severe condition on *Ægeus*, that he should annually send into Crete seven of the noblest of the Athenian youths, chosen by lot, to be devoured by the Minotaur. On the fourth year of this tribute, the choice fell on Theseus; or, as others say, he himself entreated to be sent. The king, at his son's departure, gave orders, that as the ship sail'd with black sails, it should return with the same in case he perished; but, if he became victorious, he should change them into white. When Theseus returned to Crete, after killing the Minotaur, and forgot to change the sails in token of his victory, according to the agreement with his father; the latter, who watch'd the return of the vessel, supposing by the black sails that his son was dead, cast himself headlong into the sea, which afterwards obtained the name of the *Ægean sea*. The Athenians decreed *Ægeus* divine honours; and sacrific'd to him as a marine deity, the adopted son of Neptune.

ÆGIAS, among *Physicians*, a white speck on the pupil of the eye, which occasions a dimness of sight.

ÆGIDA, (Pliny); now *Capo d'Istria* the principal town on the north of the territory of Istria, situated in a little island; join'd to the land by a bridge. In an inscription, (Gruter), it is call'd *Ægidis Insula*. E. Long. 14. 20. N. Lat. 45. 50. It was afterwards call'd *Justinopolis*, after the emperor Justinus.

ÆGILOPS, the name of a tumour in the great angle of the eye; either with, or without, an inflammation. The word is compounded of *aiç* goat, and *ops*, eye; as goats are suppos'd extremely liable to this distemper.

Authors frequently use the words *ægilops*, *anchilops*, and *fistula lachrymalis*, promiscuously; but the more accurate, after *Ægineta*, make a difference.—The tumour, before it becomes ulcerous, is properly call'd

anchilops; and, after it is got into the lachrymal passages, and has rendered the os lachrymale carious, *fistula lachrymalis*.

Ægimurus
||
Ægina.

If the *ægilops* be accompanied with an inflammation, it is suppos'd to take its rise from the abundance of blood which a plethoric habit discharges on the corner of the eye. If it be without an inflammation, it is suppos'd to proceed from a viscous pituitous humour, thrown upon this part.

The method of cure is the same as that of the ophthalmia. But before it has reach'd the lachrymal passages, it is managed like other ulcers. If the *ægilops* be neglected, it bursts, and degenerates into a fistula, which eats into the bone.

ÆGILOPS, in *Botany*. See *BOTANY Index*.

ÆGIMURUS, in *Ancient Geography*, an island in the bay of Carthage, about 30 miles distant from that city, (Livy); now the *Goletta*: This island being afterwards sunk in the sea, two of its rocks remained above water, which were call'd *Aræ*, and mention'd by Virgil, because the Romans and Carthaginians enter'd into an agreement or league to limit their respective boundaries by these rocks.

ÆGINA, in *Fabulous History*, the daughter of *Æopos*, king of Bœotia, was belov'd by Jupiter, who debauch'd her in the similitude of a lambent flame, and then carried her from Epidaurus to a desert island call'd *Oenope*, which afterwards obtain'd her own name.

ÆGINA, in *Ancient Geography*, an island in the Saronic bay, or bay of Engia, 20 miles distant from the Piræus, formerly vying with Athens for naval power, and at the sea-fight of Salamis disputing the palm of victory with the Athenians. It was the country and kingdom of *Æacus*, who call'd it *Ægina* from his mother's name, it being before call'd *Oenopia*, (Ovid.) The inhabitants were call'd *Æginetæ*, and *Æginenses*. The Greeks had a common temple dedicated to Jupiter in *Ægina*. The *Æginetæ* apply'd to commerce; and were the first who coin'd money, call'd *Νεμισμα Αργυριον*; hence *Ægineticum æs*, formerly in great repute. The inhabitants were call'd *Myrmidones*, or a nation of ants, from their great application to agriculture. See *ÆACUS*.

This island was surrounded by Attica, the territory of Megara, and the Peloponnesus, each distant about 100 stadia, or 12 miles and a half. In circumference it was reckon'd 180 stadia, or 22 miles and a half. It was wash'd on the east and south by the Myrtoan and Cretan seas.

It is now call'd *Egina*, or *Egina*, the *g* soft and the *i* short. The temple above mention'd is situated upon the summit of a mountain call'd *Panhellenius*, at some distance from the shore. The *Æginetans* affirm'd it was erect'd by *Æacus*; in whose time Greece being terribly oppress'd by drought, the Delphic oracle was consult'd; and the response was, That Jupiter must be render'd propitious by *Æacus*. The cities entreat'd him to be their mediator: He sacrific'd and pray'd to Jupiter *Panhellenius*, and procur'd rain.

The temple was of the Doric order, and had six columns in front. Twenty-one of the exterior columns are yet standing, with two in the front of the pronaos and of the posticum, and five of the number which form'd the ranges of the cell. The entablature, except the

Ægina. the architrave, is fallen. The stone is of a light brownish colour, much eaten in many places, and indicating a very great age. Some of the columns have been injured by boring to their centres for the metal. In several, the junction of the parts is so exact, that each seems to consist of one piece. This ruin Mr Chandler considers as scarcely to be paralleled in its claim to a remote antiquity. The situation on a lonely mountain, at a distance from the sea, has preserved it from total demolition, amid all the changes and accidents of numerous centuries.

Near the shore is a barrow, raised, it is related, for Phocus, upon the following occasion. Telamon and Peleus, sons of Æacus, challenged their half brother Phocus to contend in the Pentathlon. In throwing the stone, which served as a quoit, Peleus hit Phocus, who was killed; when both of them fled. Afterwards Telamon sent a herald to assert his innocence. Æacus would not suffer him to land, or to apologize, except from the vessel; or, if he chose rather, from a heap cast up in the water. Telamon, entering the private port by night, raised a barrow, as a token, it is likely, of a pious regard for the deceased. He was afterwards condemned, as not free from guilt; and sailed away again to Salamis. The barrow in the second century, when seen by Pausanias, was surrounded with a fence, and had on it a rough stone. The terror of some dreadful judgment to be inflicted from heaven had preserved it entire and unaltered to his time; and in a country depopulated and neglected, it may still endure for many ages.

The soil of this island is, as described by Strabo, very stony, especially the bottoms, but in some places not unfertile in grain. Besides corn, it produces olives, grapes, and almonds; and abounds in pigeons and partridges. It has been related, that the Æginetans annually wage war with the feathered race, carefully collecting or breaking their eggs, to prevent their multiplying, and in consequence a yearly famine. They have no hares, foxes, or wolves. The rivers in summer are all dry. The waiwode or governor farms the revenue of the Grand Signior for 12 purses, or 6000 piastres. About half this sum is repaid yearly by the caratch-money, or poll tax.

ÆGINA, the capital of the above island. Its site has been long forsaken. Instead of the temples mentioned by Pausanias, there are 13 lonely churches, all very mean; and two Doric columns supporting their architrave. These stand by the sea-side toward the low cape; and, it has been supposed, are a remnant of a temple of Venus, which was situated by the port principally frequented. The theatre, which is recorded as worth seeing, resembled that of the Epidaurians both in size and workmanship. It was not far from the private port; the stadium, which, like that at Priene, was constructed with only one side, being joined to it behind, and each structure mutually sustaining and propping the other. The walls belonging to the ports and arsenal were of excellent masonry, and may be traced to a considerable extent, above, or nearly even with, the water. At the entrance of the mole, on the left, is a small chapel of St Nicholas; and opposite, a square tower with steps before it, detached, from which a bridge was laid across, to be removed on any alarm. This

structure, which is mean, was erected by the Venetians, while at war with the Turks in 1693.

ÆGINETA, PAULUS, a celebrated surgeon of the island of Ægina, from whence he derived his name. According to Mr Le Clerc's calculation, he lived in the fourth century; but Abulpharagius the Arabian, who is allowed to give the best account of those times, places him with more probability in the seventh. His knowledge in surgery was very great, and his works are deservedly famous. Fabricius ab Aquapendente has thought fit to transcribe him in a great variety of places. Indeed the doctrine of Paulus Ægineta, together with that of Celsus and Albucasis, make up the whole text of this author. He is the first writer who takes notice of the cathartic quality of rhubarb; and, according to Dr Milward, is the first in all antiquity who deserves the title of man-midwife.

ÆGINHARD, the celebrated secretary and supposed son-in-law of Charlemagne. He is said to have been carried through the snow on the shoulders of the affectionate and ingenious Imma, to prevent his being tracked from her apartments by the emperor her father: a story which the elegant pen of Addison has copied and embellished from an old German chronicle, and inserted in the 3d volume of the Spectator.—This happy lover (supposing the story to be true) seems to have possessed a heart not unworthy of so enchanting a mistress, and to have returned her affection with the most faithful attachment; for there is a letter of Æginhard's still extant, lamenting the death of his wife, which is written in the tenderest strain of connubial affliction;—it does not, however, express that this lady was the affectionate princess; and indeed some late critics have proved that Imma was not the daughter of Charlemagne.—But to return to our historian: He was a native of Germany, and educated by the munificence of his imperial master, of which he has left the most grateful testimony in his preface to the life of that monarch. Æginhard, after the loss of his lamented wife, is supposed to have passed the remainder of his days in religious retirement, and to have died soon after the year 840. His life of Charlemagne, his annals from 741 to 889, and his letters, are all inserted in the 2d volume of Duchesne's *Scriptores Francorum*. There is an improved edition of this valuable historian, with the annotations of Hermann Schmincke, in 4to, 1711.

ÆGIPAN, in *Heathen Mythology*, a denomination given to the god Pan, because he was represented with the horns, legs, feet, &c. of a goat.

ÆGIPHILA, GOAT-FRIEND, in *Botany*. See *BOTANY Index*.

ÆGIS, in the *Ancient Mythology*, a name given to the shield or buckler of Jupiter and Pallas.

The goat Amalthea, which had suckled Jove, being dead, that god is said to have covered his buckler with the skin; whence the appellation *ægis*, from *αἴς, αἴγος, she-goat*. Jupiter, afterwards restored the animal to life, covered it with a new skin, and placed it among the stars. He made a present of his buckler to Minerva: whence that goddess's buckler is also called *ægis*.

Minerva, having killed the Gorgon Medusa, nailed her head in the middle of the *ægis*, which henceforth had

Ægisthus had the faculty of converting into stone all those who looked upon it; as Medusa herself had done during her life.

Others suppose the ægis not to have been a buckler, but a cuirass, or breastplate; and it is certain the ægis of Pallas, described by Virgil, *Æn.* lib. viii. ver. 435, must have been a cuirass; since that poet says expressly, that Medusa's head was on the breast of the goddess. But the ægis of Jupiter, mentioned a little higher, ver. 354, seems to have been a buckler: the words

Cum sepe nigram

Ægida concuteret dextra,

are descriptive of a buckler; but not at all of a cuirass or breastplate.

Servius makes the same distinction on the two passages of Virgil; for on verse 354, he takes the ægis for the buckler of Jupiter, made, as above mentioned, of the skin of the goat Amalthea; and on verse 435, he describes the ægis as the armour which covers the breast, and which in speaking of men is called *cuirass*, and *ægis* in speaking of the gods. Many authors have overlooked these distinctions for want of going to the sources.

ÆGISTHUS, in *Ancient History*, was the son of Thyestes by his own daughter Piloepia, who, to conceal her shame, exposed him in the woods; some say he was taken up by a shepherd, and suckled by a goat, whence he was called *Ægisthus*. He seduced Clytemnestra the wife of Agamemnon and lived with her during the siege of Troy. Afterwards with her assistance he slew her husband, and reigned seven years in Mycenæ. He was, together with Clytemnestra, slain by Orestes. Pompey used to call Julius Cæsar *Ægisthus*, on account of his having seduced his wife Mutia, whom he afterwards put away, though he had three children by her.

ÆGITHALLUS, in *Ancient Geography*, a promontory and citadel of Sicily, between Drepanum and the Emporium Ægistanum, afterwards called *Acellus*; corruptly written *Ægibarfos*, in Ptolemy; situated near Mount Eryx, and now called *Capo di Santo Teodoro*.

ÆGIUM, in *Ancient Geography*, a town of *Achaia Propria*, five miles from the place where Helice stood, and famous for the council of the Achæans, which usually met there on account either of the dignity or commodious situation of the place. It was also famous for the worship of *Ὀμνυγίος Ζεὺς*, *Conventional Jupiter*, and of *Panachæan Ceres*. The territory of Ægium was watered by two rivers, viz. the Phoenix and Megarites. The epithet is *Ægiensis*. There is a coin in the cabinet of the king of Prussia, with the inscription AIGI, and the figure of a tortoise, which is the symbol of Peloponnesus, and leaves no doubt as to the place where it was struck.

ÆGOBOLIUM, in *Antiquity*, the sacrifice of a goat offered to Cybele. The ægobolium was an expiatory sacrifice, which bore a near resemblance to the taurobolium and criobolium, and seems to have been sometimes joined with them.

ÆGOPIDIUM, SMALL WILD ANGELICA GOATWORT, GOATFOOT, in *Botany*. See *BOTANY Index*.

ÆGOPRICON, in *Botany*. See *BOTANY Index*.

ÆGOSPOTAMOS, in *Ancient Geography*, a river in the Thracian Chersonesus, falling with a south-east course into the Hellespont, to the north of Sestos; also a town, station, or road for ships at its mouth. Here the Athenians, under Conon, through the fault of his colleague Isocrates, received a signal overthrow from the Lacedæmonians under Lyfander, which was followed by the taking of Athens, and put an end to the Peloponnesian war. The Athenian fleet having followed the Lacedæmonians, anchored in the road, over against the enemy, who lay before Lampacus. The Hellespont is not above two thousand paces broad in that place. The two armies seeing themselves so near each other, expected only to rest that day, and were in hopes of coming to a battle on the next.

But Lyfander had another design in his view. He commanded the seamen and pilots to go on board their galleys, as if they were in reality to fight the next morning at break of day, to hold themselves in readiness, and to wait his orders with profound silence. He commanded the land army in like manner to draw up in order of battle upon the coast, and to wait the day without noise. On the morrow, as soon as the sun was risen, the Athenians began to row towards them with their whole fleet in one line, and to bid them defiance. Lyfander, though his ships were ranged in order of battle, with their heads towards the enemy, lay still without making any movement. In the evening, when the Athenians withdrew, he did not suffer his soldiers to go ashore, till two or three galleys, which he had sent out to observe them, were returned with advice that they had seen the enemy land. The next day passed in the same manner, as did the third and fourth. Such a conduct, which argued reserve and apprehension, extremely augmented the security and boldness of the Athenians, and inspired them with an extreme contempt for an army, which fear, in their sense, prevented from showing themselves, and attempting any thing.

Whilst this passed, Alcibiades, who was near the fleet, took horse, and came to the Athenian generals: to whom he represented, that they kept upon a very disadvantageous coast, where there were neither ports nor cities in the neighbourhood; that they were obliged to bring their provisions from Sestos with great danger and difficulty; and that they were very much in the wrong to suffer the soldiers and mariners of the fleet, as soon as they were ashore, to straggle and disperse themselves at their own pleasure, whilst they were faced in view by the enemy's fleet, accustomed to execute the orders of their general with the readiest obedience, and upon the slightest signal. He offered also to attack the enemy by land with a strong body of Thracian troops, and to force them to a battle. The generals, especially Tydeus and Menander, jealous of their command, did not content themselves with refusing his offers, from the opinion, that if the event proved unfortunate, the whole blame would fall on them, and if favourable, that Alcibiades alone would have the honour of it; but rejected also with insult his wife and salutary counsel, as if a man in disgrace lost his sense and abilities with the favour of the commonwealth. Alcibiades withdrew.

The fifth day the Athenians presented themselves again,

Ægopri-
con,
Ægospota-
mos.

Ægypto-
mos
|
Ægyptilla.

again, and offered battle; retiring in the evening according to custom with more insulting airs than the days before. Lyfander, as usual, detached some galleys to observe them, with orders to return with the utmost diligence when they saw the Athenians landed, and to put up a brazen buckler at each ship's head as soon as they reached the middle of the channel. He in the mean time ran through the whole line in his galley, exhorting the pilots and officers to hold the seamen and foldiers in readiness to row and fight on the first signal.

As soon as the bucklers were put up in the ships heads, and the admiral galley had given the signal by the sound of trumpet, the whole fleet set forward in good order. The land army at the same time made all possible haste to the top of the promontory to see the battle. The strait that separates the two continents in this place is about fifteen stadia, or three quarters of a league in breadth; which space was presently cleared through the activity and diligence of the rowers. Conon the Athenian general was the first who perceived from shore, that fleet advance in good order to attack him; upon which he immediately cried out for the troops to embark. In the height of sorrow and trouble, some he called to by their names, some he conjured, and others he forced to go on board their galleys; but all his endeavours and emotions were ineffectual, the foldiers being dispersed on all sides. For they were no sooner come on shore, than some ran to the sutlers, some to walk in the country, some to sleep in their tents, and others had begun to dress their suppers. This proceeded from the want of vigilance and experience in their generals, who, not suspecting the least danger, indulged themselves in their taking repose, and gave their foldiers the same liberty.

The enemy had already fallen on with loud cries and a great noise of their oars, when Conon, disengaging himself with nine galleys, of which number was the sacred ship called the *Paralian*, stood away for Cyprus, where he took refuge with Evagoras. The Peloponnesians, falling upon the rest of the fleet, took immediately the galleys which were empty, and disabled and destroyed such as began to fill with men. The foldiers, who ran without order or arms to their relief, were either killed in the endeavour to get on board, or flying on shore were cut to pieces by the enemy, who landed in pursuit of them. Lyfander took 3000 prisoners, with all the generals, and the whole fleet. After having plundered the camp, and fastened the enemy's galleys to the stems of his own, he returned to Lamplacus amidst the sound of flutes and songs of triumph. It was his glory to have achieved one of the greatest military exploits recorded in history with little or no loss, and to have terminated a war in the small space of an hour, which had already lasted 27 years, and which, perhaps, without him, had been of much longer continuance.

ÆGYPT. See EGYPT.

ÆGYPTIACUM, in *Pharmacy*, the name of several detergent ointments; as black, red, white, simple, and compound.

ÆGYPTILLA, in *Natural History*, the name of a stone described by the ancients, and said, by some authors, to have the remarkable quality of giving water the colour and taste of wine. This seems a very ima-

ginary virtue, as are indeed too many of those in former ages attributed to stones. The descriptions left us of this remarkable fossil tell us, that it was variegated with, or composed of, veins of black and white, or black and bluish, with sometimes a plate or vein of whitish red. The authors of these accounts seem to have understood by this name the several stones of the onyx, sardonix, and cameo kind; all which we have at present common among us, but none of which possess any such strange properties.

ÆGYPTUS, in *Fabulous History*, was the son of Belus, and brother of Danaus. See BELIDES.

ÆINAUTÆ, in *Antiquity*, αἰναυται, always mariners, a denomination given to the senators of Miletus, because they held their deliberations on board a ship, and never returned to land till matters had been agreed on.

ÆLFRIC, an eminent ecclesiastic of the 10th century, was the son of an earl of Kent, and a monk of the Benedictine order in the monastery of Abingdon. In 963, he was settled in the cathedral of Winchester, under Athelwold the bishop, and undertook the instruction of the youth of the diocese, for which purpose he compiled a Latin Saxon vocabulary, and some Latin colloquies. He also translated from the Latin into Saxon many of the historical books of the Old Testament. While he resided at Winchester he drew up Canons, which are a kind of charge to be delivered by the bishops to their clergy. He was afterwards abbot of St Alban's, bishop of Wilton, and, finally, in 994, translated to the see of Canterbury. Here he had a hard struggle for some years in bravely defending his diocese against the incursions of the Danes. He died in 1005, and was buried at Abingdon, but his remains were removed to Canterbury in the reign of Canute. Ælfric is held up as one of the most distinguished prelates of the Saxon church. His learning, for the times, was considerable, his morals were pure, and his religious sentiments were untainted with many of the corruptions of the age in which he lived. Beside the works already mentioned, he translated two volumes of Homilies from the Latin Fathers.

ÆLFRIC, surnamed *Bata*, pupil of the former, was promoted to the archbishopric of York in 1023, and died in 1051.

ÆLFRIC, an abbot of Malmesbury in 974, was created bishop of Crediton in 977, and died in 981.

ÆLIA *Capitolina*, a name given to the city built by the emperor Adrian, A. D. 134, near the spot where the ancient Jerusalem stood, which he found in ruins when he visited the eastern parts of the Roman empire. A Roman colony was settled here, and a temple, in place of that of Jerusalem, was dedicated to Jupiter Capitolinus. Hence the name is derived, to which he prefixed that of his own family.

ÆLIAN, CLAUDIUS, born at Præneste in Italy. He taught rhetoric at Rome, according to Perizonius, under the emperor Alexander Severus. He was surnamed *Μελιγλωσσος*, *Honey-mouth*, on account of the sweetness of his style in his discourses and writings. To this excellence the poet alludes:

*O jucunda, Covine, solitudo,
Carrucâ magis, essedoque gratum,
Facundi mihi munus Æliani.*

MARTIAL.

He

Ælii He was likewise honoured with the title of *Sophist*, an appellation in his days given only to men of learning and wisdom. He loved retirement, and devoted himself to study. He greatly admired and studied Plato, Aristotle, Isocrates, Plutarch, Homer, Anacreon, Archilochus, &c. and, though a Roman, gives the preference to the writers of the Greek nation. His two most celebrated works are, his *Various History*, and *History of Animals*. He composed likewise a book on Providence, mentioned by Eusebius; and another on Divine Appearances, or The Declarations of Providence. There have been several editions of his *Various History*.

ÆLII PONS, in *Ancient Geography*, one of the fortresses near the wall or rampart, or, in the words of the Notitia, through the line of the hither wall; built, as is thought, by Adrian, now named Portland, in Northumberland, between Newcastle and Morpeth, (Camden.)

ÆLIUS PONS, now *il Ponte St Angelo*, a stone bridge at Rome, over the Tiber, which leads to the Borgo and Vatican from the city, along Adrian's mole, built by the emperor Adrian.

ÆLFRED. See ALFRED.

ÆLURUS, in *Egyptian Mythology*, the deity or god of cats; represented sometimes like a cat, and sometimes like a man with a cat's head. The Egyptians had so superstitious a regard for this animal, that the killing it, whether by accident or design, was punished with death: and Diodorus relates, that, in the time of extreme famine, they chose rather to eat one another than touch these sacred animals.

ÆEM, AM, or AME, a liquid measure used in most parts of Germany; but different in different towns: the æem commonly contains 20 vertils, or 80 masses; that of Heidelberg is equal to 48 masses; and that of Wirtemberg to 160 masses. See AAM.

ÆMILIUS PAULUS, the son of Æmilius Paulus who was killed at the battle of Cannæ. He was twice consul. In his first consulate he triumphed over the Ligurians; and in the second subdued Perseus king of Macedonia, and reduced that country to a Roman province, on which he obtained the surname of Macedonicus. He returned to Rome loaded with glory, and triumphed for three days. He died 168 years before Christ.

ÆMILIUS, *Paulus*, a celebrated historian, born at Verona, who obtained such reputation in Italy, that he was invited into France by the cardinal of Bourbon, in the reign of Louis XII. in order to write the history of the kings of France in Latin, and was presented to a canonry in the cathedral of Paris. He was near 30 years in writing that history, which has been greatly admired; and died at Paris on the 5th of May 1529.

ÆMOBOLIUM, in *Antiquity*, the blood of a bull or ram offered in the sacrifices, called *taurobolia* and *criobolia*; in which sense the word occurs in ancient inscriptions.

ÆNARIA, in *Ancient Geography*, an island in the bay of Cumæ, or over-against Cumæ in Italy, (Pliny). It is also called *Inarime* (Virgil); and now *Ischia*: scarce three miles distant from the coast, and the promontory Misenus to the west; 20 miles in compass; called *Pithecusa* by the Greeks. It is one of the *Oenotrides*, and fenced round by very high rocks, so as to

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be inaccessible but on one side; it was formerly famous for its earthen ware. See ISCHIA.

ÆNEAS, in *Fabulous History*, a famous Trojan prince, the son of Anchises and Venus. At the destruction of Troy, he bore his aged father on his back, and saved him from the Greeks; but being too solicitous about his son and household gods, lost his wife Creusa in the escape. Landing in Africa, he was kindly received by Queen Dido: but quitting her coast, he arrived in Italy, where he married Lavinia the daughter of King Latinus, and defeated Turnus, to whom she had been contracted. After the death of his father-in-law, he was made king of the Latins, over whom he reigned three years: but joining with the Aborigines, he was slain in a battle against the Tuscans. Virgil has rendered the name of this prince immortal, by making him the hero of his poem. See ÆNEID.

ÆNEAS SYLVIUS, *Pope*. See PIUS II.

ÆNEATORES, in *Antiquity*, the musicians in an army, including those who played trumpets, horns, &c. The word is formed from *æneus*, on account of the brazen instruments used by them.

ÆNEID, the name of Virgil's celebrated epic *Blair's Lectures* poem. The subject of the Æneid, which is the establishment of Æneas in Italy, is extremely happy. Nothing could be more interesting to the Romans than to look back to their origin from so famous a hero. While the object was splendid itself, the traditional history of his country opened interesting fields to the poet; and he could glance at all the future great exploits of the Romans, in its ancient and fabulous state.

As to the unity of action, it is perfectly well preserved in the Æneid. The settlement of Æneas, by the order of the gods, is constantly kept in view. The episodes are linked properly with the main subject. The nodus, or intrigue of the poem, is happily managed. The wrath of Juno, who opposes Æneas, gives rise to all his difficulties, and connects the human with the celestial operations throughout the whole poem.

One great imperfection of the Æneid, however, is, that there are almost no marked characters in it. Achates, Cloanthes, Gyas, and other Trojan heroes who accompanied Æneas into Italy, are insipid figures. Even Æneas himself is without interest. The character of Dido is the best supported in the whole Æneid.

The principal excellency of Virgil is tenderness. His soul was full of sensibility. He must have felt himself all the affecting circumstances in the scenes he describes; and he knew how to touch the heart by a single stroke. In an epic poem this merit is the next to sublimity. The second book of the Æneid is one of the greatest masterpieces that ever was executed. The death of old Priam, and the family-pieces of Æneas, Anchises, and Creusa, are as tender as can be conceived. In the fourth book, the unhappy passion and death of Dido are admirable. The episodes of Pallas and Evander, of Nisus and Euryalus, of Lausus and Mezentius, are all superlatively fine.

In his battles, Virgil is far inferior to Homer. But in the important episode, the descent into hell, he has outdone Homer by many degrees. There is nothing in antiquity to equal the sixth book of the Æneid.

ÆNGINA, one of the islands of the Archipelago.

Ænigma. It lies in the bay of Engia, and the town of that name contains about 800 houses and a castle; and near it are the ruins of a magnificent structure, which was probably a temple.

ÆNIGMA, denotes any dark saying, wherein some well-known thing is concealed under obscure language. The word is Greek, *Αἰνίγμα*, formed of *αἰνιόμαι*, *obscurè innuere*, to hint a thing darkly, and of *αἶνος*, an obscure speech or discourse. The popular name is *riddle*; from the Belgic *raeden*, or the Saxon *araethan*, to interpret. F. Bouhours, in the memoirs of Trevoux, defines an *ænigma*, a discourse or painting, including some hidden meaning, which is proposed to be guessed.

Painted ÆNIGMAS, are representations of the works of nature or art, concealed under human figures, drawn from history or fable.

A Verbal ÆNIGMA, is a witty, artful, and abstruse description of any thing.—In a general sense, every dark saying, every difficult question, every parable, may pass for an *ænigma*. Hence obscure laws are called *Ænigmata Juris*. The alchemists are great dealers in the *ænigmatic* language, their processes for the philosophers stone being generally wrapped up in riddles: e. g. *Fac ex mare et fœmina circulum, inde quadrangulum, hinc triangulum, fac circulum, et habebis lapidem philosophorum.*—F. Menestrier has attempted to reduce the composition and resolution of *ænimas* to a kind of art, with fixed rules and principles, which he calls the philosophy of *ænigmatic* images.

The Subject of an ÆNIGMA, or the thing to be concealed and made a mystery of, he justly observes, ought not to be such in itself; but, on the contrary, common, obvious, and easy to be conceived. It is to be taken, either from nature, as the heavens or stars; or from art, as painting, the compass, a mirror, or the like.

The form of ÆNIGMAS consists in the words, which, whether they be in prose or verse, contain either some description, a question, or a prosopœia. The last kind are the most pleasing, inasmuch as they give life and action to things which otherwise have them not. To make an *ænigma*, therefore, two things are to be pitched on, which bear some resemblance to each other, as the sun and a monarch; or a ship and a house; and on this resemblance is to be raised a superstructure of contrarieties to amuse and perplex. It is easier to find great subjects for *ænimas* in figures than in words, inasmuch as painting attracts the eyes and excites the attention to discover the sense. The subjects of *ænimas* in painting, are to be taken either from history or fable: the composition here is a kind of metamorphosis, wherein, e. g. human figures are changed into trees, and rivers into metals. It is essential to *ænimas*, that the history or fable, under which they are presented, be known to every body; otherwise it will be two *ænimas* instead of one; the first of the history or fable, the second of the sense in which it is to be taken. Another essential rule of the *ænimas* is, that it only admits of one sense. Every *ænigma* which is susceptible of different interpretations, all equally natural, is so far imperfect. What gives a kind of erudition to an *ænigma*, is the invention of figures in situations, gestures, colours, &c. authorized by passages of

the poets, the customs of artists in statues, basso relievos, inscriptions, and medals.—In foreign colleges,

The Explication of ÆNIGMAS makes a considerable exercise; and that one of the most difficult and amusing, where wit and penetration have the largest field.—By explaining an *ænigma*, is meant the finding a motto corresponding to the action and persons represented in a picture, taken either from history or mythology. The great art of this exercise consists in the choice of a motto, which either by itself, or the circumstances of time, place, person who speaks, or those before whom he is speaking, may divert the spectators, and furnish occasion for strokes of wit; also in showing to advantage the conformities between the figure and thing figured, giving ingenious turns to the reasons employed to support what is advanced, and in artfully introducing pieces of poetry to illustrate the subject and awaken the attention of the audience.

As to the solution of *ænimas*, it may be observed, that those expressed by figures are more difficult to explain than those consisting of words, by reason images may signify more things than words can; so that to fix them to a particular sense, we must apply every situation, symbol, &c. and without omitting a circumstance.—As there are few persons in history, or mythology, but have some particular character of vice or virtue, we are, before all things, to attend to this *character*, in order to divine what the figure of a person represented in a painting signifies, and to find what agreement this may have with the subject whereof we would explain it. Thus, if Proteus be represented in a picture, it may be taken to denote *inconstancy*, and applied either to a physical or moral subject, whose character is to be changeable, e. g. an almanack, which expresses the weather, the seasons, heat, cold, storms, and the like. The *colours* of figures may also help to unriddle what they mean: *white*, for instance, is a mark of innocence, *red* of modesty, *green* of hope, *black* of sorrow, &c. When figures are accompanied with *symbols*, they are less precarious; these being, as it were, the soul of *ænimas*, and the key that opens the mystery of them. Of all the kinds of symbols which may be met with in those who have treated professedly on the subject, the only true *ænigmatic* are those of Pythagoras, which, under dark proverbs, hold forth lessons of morality; as when he says, *Stateram ne transfiliat*, to signify, Do no injustice.

But it must be added, that we meet with some *ænimas* in history, complicated to a degree which much transcends all rules, and has given great perplexity to the interpreters of them. Such is that celebrated ancient one, *Ælia Lelia Crispis*, about which many of the learned have puzzled their heads. There are two exemplars of it: one found 140 years ago, on a marble near Bologna: the other in an ancient MS. written in Gothic letters, at Milan. It is controverted between the two cities, which is to be reputed the more authentic.

The Bononian *Ænigma*.

D. M.

Ælia Lelia Crispis,

Nec vir, nec mulier,

Nec androgyna;

Nec puella, nec juvenis,

Nec

Ænigma,
Ænona.

*Nec anus ;
Nec casta, nec moretrix,
Nec pudica ;
Sed omnia :
Sublata
Neque fame, neque ferro,
Neque veneno ;
Sed omnibus :
Nec celo, nec terris,
Nec aquis,
Sed ubique jacet.
Lucius Agatho Priscius,
Nec maritus, nec amator,
Nec necessarius ;
Neque marens, neque gaudens,
Neque flens ;
Hanc,
Nec molem, nec pyramidem,
Nec sepulchrum,
Sed omnia,
Scit et nescit, cui posuerit.*

That is to say, *To the gods manes, Ælia Lælia Crispis, neither man, nor woman, nor hermaphrodite; neither girl, nor young woman, nor old; neither chaste, nor a whore; but all these: killed neither by hunger, nor steel, nor poison; but by all these: rests neither in heaven, nor on earth, nor in the waters; but everywhere. Lucius Agatho Priscius, neither her husband, nor lover, nor friend; neither sorrowful, nor joyful, nor weeping, certain, or uncertain, to whom he rears this monument, neither erects her a temple, nor a pyramid, nor a tomb, but all these.* In the MS. at Milan, instead of *D. M.* we find *A. M. P. P. D.* and at the end the following addition:

*Hoc est sepulchrum intus cadaver non habens,
Hoc est cadaver sepulchrum extra non habens,
Sed cadaver idem est et sepulchrum.*

We find near 50 several solutions of this ænigma advanced by learned men. Marius Michael Angelo maintains *Ælia Lælia Crispis* to signify rain-water falling into the sea. Ri. Vitus first explained it of Niobe turned to a stone, afterwards of the rational soul, and afterwards of the Platonic idea; Jo. Turrius, of the *materia prima*; Fr. Schottus, of an eunuch; Nic. Bernardus, of the philosophers stone, in which he is followed by Borrichius; Zach. Pontinus, of three human bodies in the same situation, and buried by three different men at the same time; Nefmondus, of a law-suit; Jo. Gaf. Gerartius, of love; Zu. Boxhornius, of a shadow; P. Terronus, of music; Fort Licetus, of generation, friendship, and privation; M. Ov. Montalbanus, of hemp; Car. Cæs. Malvasia, of an abortive girl promised in marriage; Pet. Mengulus, of the rule of chastity, prescribed by the founder of the military religion of St Mary; M. de Ciconia, of Pope Joan; Heumannus, of Lot's wife; and lastly, J. C. S. an anonymous writer in the Leipzig Acts, of the Christian church.

ÆNIGMATOGRAPHY, or ÆNIGMATHOLOGY, the art of resolving or making ænigmas.

ÆNONA, in *Ancient Geography*, a city of Liburnia, called by Pliny *Civitas Prajini*, the reason of which is unknown; also *Enona*, and is now called

Nona; on the Adriatic, by which it is for the greater part surrounded; over against the island Gissa, from which it is distant four miles to the west. E. Long. 16°. N. Lat. 28°. Ænona
Æolipile.

ÆNUS, in *Ancient Geography*, now the *Inn*, a river of Germany, which, rising in the country of the Grisons, out of the Alps, in the district called Gotteshaus-punt, runs through the Grisons, the county of Tyrol, the duchy of Bavaria, and through Passau into the Danube.

ÆNUS, *Ænos*, or *Ænum*, in *Ancient Geography*, a town of Thrace, situated on the eastmost mouth of the Hebrus, which has two mouths; and said to be built by the Cumeans. It was a free town, in which stood the tomb of Polydorus, (Pliny); *Ænius* is the epithet. Here the brother of Cato Uticensis died, and was honoured with a monument of marble in the forum of the *Ænii*, (Plutarch); called *Ænei*, (Stephanus). Livy says that the town was otherwise called *Abfynthus*. Now *Eno*.

ÆNITHOLOGIOUS, in *Poetry*, a verse of two dactyls and three trochæi; as *Prælia dira placent truci juvenia*.

ÆOLIAE INSULÆ, now *Isoli Lipari*, in *Ancient Geography*, seven islands, situated between Sicily and Italy, so called from Æolus, who reigned there about the time of the Trojan war. The Greeks call them *Hephestiades*; and the Romans *Vulcaniæ*, from their fiery eruptions. They are also called *Liparæorum Insule*, from their principal island Lipara. Dionysius Periegetes calls them ΠΑΛΙΣΤΑΙ, because circumnavigable.

ÆOLIC, in a general sense, denotes something belonging to Æolis.

ÆOLIC, or ÆOLIAN, in *Grammar*, denotes one of the five dialects of the Greek tongue. It was first used in Bœotia; whence it passed into Æolia, and was that which Sappho and Alcæus wrote in. The Æolic dialect generally throws out the aspirate or sharp spirit, and agrees in so many things with the DORIC dialect, that the two are usually confounded together.

The *Æolic digamma* is a name given to the letter F, which the Æolians used to prefix to words beginning with vowels, as *Foisos*, for *ovos*; also to insert between vowels, as *oFis*, for *cis*.

Æolic Verse, in *Prosody*, a verse consisting of an iambus, or spondee; then of two anapests, separated by a long syllable; and, lastly, of another syllable. Such as, *O stelliferi conditor orbis*. This is otherwise called *eulogic verse*; and, from the chief poets who used it, *Archilochian* and *Pindaric*.

ÆOLIPILE, in *Hydraulics*, is a hollow ball of metal, generally used in courses of experimental philosophy, in order to demonstrate the possibility of converting water into an elastic steam or vapour by heat. The instrument, therefore, consists of a slender neck, or pipe, having a narrow orifice inserted into the ball by means of a shouldered screw. This pipe being taken out, the ball is filled almost full of water, and the pipe being again screwed in, the ball is placed on a pan of kindled charcoal, where it is well heated, and there issues from the orifice a vapour, with prodigious violence and great noise, which continues till all the included water is discharged. The stronger the fire is, the more elastic and violent will be the steam; but care must be taken that the small orifice of the pipe be not,

Æolis
Æon.

by any accident, stopped up; because the instrument would in that case infallibly burst in pieces, with such violence as might greatly endanger the lives of the persons near it. Another way of introducing the water is to heat the ball red-hot when empty, which will drive out almost all the air; and then by suddenly immersing it in water, the pressure of the atmosphere will force in the fluid, till it is nearly full. Des Cartes and others have used this instrument to account for the natural cause and generation of the wind: and hence it was called *Æolipila*: q. d. *pila Æoli*, the ball of Æolus or of the god of the winds.

ÆOLIS, or **ÆOLIA**, in *Ancient Geography*, a country of the Hither Asia, settled by colonies of Æolian Greeks. Taken at large, it comprehends all Troas, and the coast of the Hellespont to the Propontis, because in those parts there were several Æolian colonies: more strictly, it is situated between Troas to the north, and Ionia to the south. The people are called *Æoles* or *Eolii*.

ÆOLIUM MARE, in *Ancient Geography*, a part of the Egean sea, washing Æolis; called also *Mysium*, from Mylia. Now called *Golfo di Smyrna*.

ÆOLUS, in *Heathen Mythology*, the god of the winds, was said to be the son of Jupiter by Acasta, or Sigesia, the daughter of Hippotus: or, according to others, the son of Hippotus by Meneclea, daughter of Hyllus king of Lipara. He dwelt in the island Strongyle, now called *Strombolo*, one of the seven islands called *Æolian* from their being under the dominion of Æolus. Others say, that his residence was at Rhegium, in Italy; and others again place him in the island Lipara. He is represented as having authority over the winds, which he held enchained in a vast cavern, to prevent their continuing the devastations they had been guilty of before they were put under his direction. Mythologists explain the original of these fables, by saying, that he was a wise and good prince; and, being skilled in astronomy, was able, by the flux and reflux of the tides, and the nature of the volcano in the island Strongyle, to foretel storms and tempests.

Harp of Æolus, or the Æolian lyre. See **ACOUSTICS**.

ÆON, a Greek word, properly signifying the age or duration of any thing.

ÆON, among the followers of Plato, was used to signify any virtue, attribute, or perfection: hence they represented the deity as an assemblage of all possible æons; and called him *pleroma*, a Greek term signifying *fulness*. The Valentinians, who, in the first ages of the church, blended the conceits of the Jewish cabalists, the Platonists, and the Chaldean philosophers, with the simplicity of the Christian doctrine, invented a kind of Theogony, or Genealogy of Gods (not unlike that of Hesiod), whom they called by several glorious names, and all by the general appellation of **ÆONS**: among which they reckoned Ζων, *Life*; Λογος, *Word*; Μονογονος, *Only-begotten*; Πληρωμα, *Fulness*; and many other divine powers and emanations, amounting in number to thirty: which they fancied to be successively derived from one another; and all from one self-originated deity, named *Bythus*, i. e. *profound* or *unfathomable*; whom they called likewise, *The most high and ineffable Father*. See **VALENTINIANS**.

Æora
Æra.

ÆORA, among ancient writers on medicine, is used for gestation; which sort of exercise was often prescribed by the physicians of those days. Other exercises consisted principally in the motion of the body; but in the *æora* the limbs were at rest, while the body was carried about and moved from place to place, in such a manner as the physician prescribed. It had therefore the advantages of exercise, without the fatigue of it.—This exercise was promoted several ways: sometimes the patient was laid in a sort of hammock, supported by ropes, and moved backward and forward; sometimes his bed run nimbly on its feet. And beside these, the several ways of travelling were accounted species of the *æora*, whether in the litter, in a boat or ship, or on even ground in a chariot.—Asclepiades was the first who brought gestation into practice, which was used as a means to recover strength after a fever, &c.

ÆQUANA JUGA, in *Ancient Geography*, mountains of Picenum, in the kingdom of Naples, now called *Montagna di Sorrento*, denominated from the town Æqua, which being destroyed, was replaced by Vicus, now *Vico di Sorrento*: called also *Æquana*, (Sil. Italicus.)

ÆQUIMELIUM, in *Antiquity*, a place in Rome, where stood the house of Spurius Melius, who, by largesses corrupting the people, affected the supreme power: refusing to appear before the dictator Cincinnatus, he was slain by Servilius Ahala, master of the horse; his house was razed to the ground; and the spot on which it stood was called *Area Equimelii*, (Livy.)

ÆRA, in *Chronology*, a fixed point of time from whence any number of years is begun to be counted.

It is sometimes also written in ancient authors *Era*. The origin of the term is contested, though it is generally allowed to have had its rise in Spain. Sepulveda supposes it formed from A. ER. A. the notæ or abbreviatures of the words, *annus erat Augusti*, occasioned by the Spaniards beginning their computation from the time their country came under the dominion of Augustus, or that of receiving the Roman calendar. This opinion, however ingenious, is rejected by Scaliger, not only on account that in the ancient abbreviatures *A* never stood for *annus*, unless when preceded by *V* for *vixit*; and that it seems improbable they should put ER for *erat*, and the letter A, without any discrimination, both for *annus* and *Augustus*. Vossius nevertheless favours the conjecture, and judges it at least as probable, as either that of Isidore, who derives *æra* from *æs*, the "tribute-money," wherewith Augustus taxed the world: or that of Scaliger himself, who deduces it likewise from *æs*, though in a different manner. *Æs*, he observes, was used among the ancients for an *article* or *item* in an account; and hence it came also to stand for a sum or number itself. From the plural *æra*, came by corruption *æra*, *æram*, in the singular: much as *Ostia*, *Ostiam*, the name of a place, from *Ostia*, the mouths of the Tyber.

The difference between the terms *æra* and *epoch* is, that the *æras* are certain points fixed by some people, or nation; and the *epochs* are points fixed by chronologists and historians. The idea of an *æra* comprehends also a certain succession of years proceeding from a fixed point of time, and the *epoch* is that point itself. Thus the

the

Ærarium the Christian æra began at the epoch of the birth of Jesus Christ. See **CHRONOLOGY**, where the different Eras, &c. are enumerated and explained.

Æria.

ÆRARIUM, the treasury or place where the public money was deposited amongst the Romans.

ÆRARIUM Sanctius contained the monies arising from the twentieth part of all legacies: this was kept for the extreme necessities of the state.

ÆRARIUM Privatum was the emperor's privy purse, or the place where the money arising from his private patrimony was deposited.

ÆRARIUM Viceimarum, the place where the money arising from the taxes levied from foreign countries was laid up, so called because it most commonly consisted of a twentieth part of the produce.

ÆRARIUM Ilithyæ, or *Junonis Lucine*, was where the monies were deposited which parents paid for the birth of each child.

There are several other treasuries mentioned in history, as the *ærarium Juventutis*, *Veneris*, &c. The temple of Saturn was the public treasury of Rome, either because Saturn first taught the Italians to coin money, or, which is most likely, because this temple was the strongest and most secure, and therefore the fittest place for that purpose.

Ærarium differs from *fuscus*, as the first contained the public money, the second that of the prince. The two are, however, sometimes indiscriminately used for each other.

ÆRARIUS, a name given by the Romans to a degraded citizen, who had been struck off the list of his century. Such persons were so called because they were liable to all the taxes (*æra*), without enjoying any of its privileges.

The *ærarii* were incapable of making a will, of inheriting, of voting in assemblies, of enjoying any post of honour or profit; in effect, were only subject to the burdens, without the benefits of society; yet they retained their freedom, and were not reduced to the condition of slaves. To be made an *ærarius* was a punishment inflicted for some offence, and reputed one degree more severe than to be expelled a tribe, *tribu moveri*.

ÆRARIUS was also an officer instituted by Alexander Severus, for the distribution of the money given in largesses to the soldiery or people.

ÆRARIUS was also used for a person employed in coining or working brass.

These are sometimes called *ærarii fusores*: at other times, *ærarius* is distinguished from *fusor*; the former answering to what we now call copper-smiths, the latter to founders.

ÆRARIUS was likewise applied to a soldier who receives pay.

AERIA, or **EERIA**, in *Ancient Geography*, the ancient name of Egypt. The scholiast on Apollonius Rhodius, says, that not only Theſſaly, but Egypt, was called *Hegia* by the Greeks, which Eusebius also confirms: and hence Apollinarius, in his translation of the 114th Psalm, uses it for Egypt. Hesychius applies this name to Ethiopia.

AERIAL, in a general sense, denotes something partaking of the nature of air; thus aerial substances, aerial particles, &c.

Aerial
Aerophalacea.

AERIAL Perspective. See **PERSPECTIVE** and **PAINTING**.

AERIANS, in *Church History*, a branch of Arians, who, to the doctrines of that sect, added some peculiar dogmas of their own; as, that there is no difference between bishops and priests; a doctrine maintained by many modern divines, particularly of the presbyterian and reformed churches. The sect received its denomination from Aerius an Armenian priest of the fourth century. He founded his doctrine chiefly upon some passages in St Paul; and, among others, upon that in 1 Tim. iv. 14. where the apostle exhorts him not to neglect the gift he had received by the laying on of the hands of the Presbytery. Here, observes Aerius, is no mention of bishops: on the contrary, Timothy evidently received his ordination from the presbyters or priests.—Epiphanius zealously maintains the superiority of bishops against the Aerians. The word *presbytery*, used by the apostle, he observes, includes both bishops and priests; the whole senate or assembly of the ecclesiastics of the place.

FLOS ÆRIS, among *Alchemists*, small scales procured from copper melted by a strong heat; it is sometimes used for ærugo or verdigris.

AEROGRAPHY, from *æro*, air, and *γραφω*, I describe; a description of the air, or atmosphere, its limits, dimensions, properties, &c. This amounts to much the same with aerology, unless we suppose the latter to enter into the rational, and the former to confine itself to a description of the more obvious affections thereof. See **METEOROLOGY**.

AEROMANCY, a species of divination performed by means of air, wind, &c. See **DIVINATION**.

AEROMETRY, the science of measuring the air. It comprehends not only the doctrine of the air itself, considered as a fluid body; but also its pressure, elasticity, rarefaction, and condensation. But the term is at present not much in use, this branch of natural philosophy being more frequently called **Pneumatics**. See **PNEUMATICS**.

AERONAUT, a person who navigates or floats in the air by means of an air balloon. See **AEROSTATION**.

AERONAUTICA, from *æro*, and *ναυτικός*, derived from *ναυς*, ship; the art of sailing in a vessel or machine through the atmosphere, sustained as a ship in the sea. See **AEROSTATION**.

AEROPHALACEA, a term used by naturalists for caverns or reservoirs of air, supposed to exist in the bowels of the earth. Kircher speaks much of aerophylacea, or huge caverns replete with air, disposed under ground; from whence, through numerous occult passages, that element is conveyed either to subterraneous receptacles of water, which, according to him, are hereby raised into springs or rivers, or into the funds of subterraneous fire, which are hereby fed and kept alive for the restoration of metals, minerals, and the like.

AEROSTATION

A E R O S T A T I O N

IN its primitive sense, denotes the science of weights suspended in the air; but in its modern acceptation, it signifies *aerial navigation*, or the art of navigating through the atmosphere. Hence also the machines which are employed for this purpose are called *aerostats*, or *aerostatic machines*; and from their globular shape, *air balloons*.

Friar Bacon first published the true principles of aerostation.

The romances of almost every nation have recorded instances of persons being carried through the air, both by the agency of spirits and by mechanical inventions; but till the time of Friar Bacon, who died in 1292, no rational principle appears ever to have been thought of by which this might be accomplished. He had written upon the subject, and not only assures us of the practicability of the art, but that he knew how to construct a machine in which a man might transport himself through the air like a bird; and he affirms that the experiment had been successfully made by another person. The machine consisted of two large thin shells, or hollow globes of copper which were exhausted of air; and thus being lighter than air, would support a chair on which a person might sit.

Impossibility of flying by mechanical means.

Many had been of opinion, that, by means of artificial wings, fixed to the arms or legs, a man might fly as well as a bird: but these opinions were thoroughly refuted by Borelli in his treatise *De Motu Animalium*, where, from a comparison between the power of the muscles which move the wings of a bird, and those which move the arms of a man, he demonstrates that the latter are utterly insufficient to strike the air with such force as to raise him from the ground. It cannot be denied, however, that wings of this kind, if properly constructed, and dexterously managed, might be sufficient to break the fall of a human body from a high place, so that some adventurers in this way might possibly come off with safety; though by far the greatest number of those who have rashly adopted such schemes, have either lost their lives or limbs in the attempt.

Scheme of Bishop Wilkins and Albertus de Saxonis.

In the year 1672, Bishop Wilkins published a treatise, entitled, *The Discovery of the New World*; in which he mentions, though in a very indistinct and confused manner, the true principle on which the air is navigable; quoting, from Albertus de Saxonis and Francis Mendoza, "that the air is in some part of it navigable: and upon this static principle, any brass or iron vessel (suppose a kettle), whose substance is much heavier than that of water, yet being filled with the lighter air, it will swim upon it and not sink. So suppose a cup or wooden vessel upon the outward borders of this elementary air, the capacity of it being filled with fire, or rather ethereal air, it must necessarily, upon the same ground, remain swimming there, and of itself can no more fall than an empty ship can sink." This idea, however, he did not by any means pursue, but rested his hopes entirely upon mechanical motions, to be accomplished by the mere strength of a man, or by springs, &c. and which have been demonstrated incapable of answering any useful purpose.

The only person who brought his scheme of flying to any kind of rational principle was the Jesuit Francis Lana, cotemporary with Bishop Wilkins. His method was similar to Friar Bacon's. He was acquainted with the real weight of the atmosphere, and, justly concluded, that if a globular vessel were exhausted of air, it would weigh less than before; and considering that the solid contents of vessels increase in much greater proportion than their surfaces; he supposed that a metalline vessel might be made so large, that, when emptied of its air, it would be able not only to raise itself in the atmosphere, but to carry up passengers along with it; and he made a number of calculations necessary for putting the project in execution. But though the theory was here unexceptionable, the means proposed were certainly insufficient to accomplish the end: for a vessel of copper, made so thin as was necessary to make it float in the atmosphere, would be utterly unable to resist the external pressure; which being demonstrated by those skilled in mechanics, no attempt was made on that principle.

Bishop Lana's scheme.

In the year 1709, however, as we are informed by a letter published in France in 1784, a Portuguese projector, Friar Guffman, applied to the king for encouragement to his invention of a flying machine. The principle on which this was constructed, if indeed it had any principle, seems to have been that of the paper kite. The machine was constructed in form of a bird, and contained several tubes through which the wind was to pass, in order to fill a kind of sails, which were to elevate it; and when the wind was deficient, the same effect was to be performed by means of bellows concealed within the body of the machine. The ascent was also to be promoted by the electric attraction of pieces of amber placed in the top, and by two spheres enclosing magnets in the same situation.

Strange proposal of Friar Guffman.

These childish inventions show the low state of science at that time in Portugal, especially as the king, in order to encourage him to farther exertions in such an useful invention, granted him the first vacant place in his college of Barcelos or Santarem, with the first professorship in the university of Coimbra, and an annual pension of 600,000 reis during his life. Of this De Guffman, it is also related, that, in the year 1736, he made a wicker basket of about seven or eight feet diameter, and covered with paper, which raised itself about 200 feet in the air, and the effect was generally attributed to witchcraft.

In the year 1766, Mr Henry Cavendish ascertained the weight and other properties of inflammable air, determining it to be at least seven times lighter than common air. Soon after which it occurred to Dr Black, that perhaps a thin bag filled with inflammable air might be buoyed up by the common atmosphere, and he thought of having the allantois of a calf prepared for this purpose: but his other avocations prevented him from prosecuting the experiment. The same thought occurred some years afterwards to Mr Cavallo; and he has the honour of being the first who made experiments

Possibility of bodies rising in the air thought of by Dr Black and Mr Cavallo.

periments on the subject. He first tried bladders; but the thinnest of these, however well scraped and prepared, were found too heavy. He then tried Chinese paper; but that proved so permeable, that the vapour passed through it like water through a sieve. His experiments, therefore, made in the year 1782, proceeded no farther than blowing up soap bubbles with inflammable air, which ascended rapidly to the ceiling, and broke against it.

Aerostation discovered by Mons. Montgolfier.

But while the discovery of the art of aerostation seemed thus on the point of being made in Britain, it was all at once announced in France, and that from a quarter whence nothing of the kind was to have been expected. Two brothers, Stephen and John Montgolfier, natives of Annonay, and masters of a considerable paper manufactory there, had turned their thoughts towards this project as early as the middle of the year 1782. The idea was first suggested by the natural ascent of the smoke and clouds in the atmosphere; and their design was to form an artificial cloud, by enclosing the smoke in a bag, and making it carry up the covering along with it. Towards the middle of November that year, the experiment was made at Avignon with a fine silk bag of a paralleloiped shape. By applying burning paper to the lower aperture, the air was rarefied, and the bag ascended in the atmosphere, and struck rapidly against the ceiling. On repeating the experiment in the open air, it rose to the height of about 70 feet.

Account of his experiments.

An experiment on a more enlarged scale was now projected; and a new machine, containing about 650 cubic feet, was made, which broke the cords that confined it, and rose to the height of about 600 feet. Another of 35 feet in diameter rose about 1000 feet high, and fell to the ground three quarters of a mile from the place where it ascended. A public exhibition was next made on the 5th of June 1783, at Annonay, where a vast number of spectators assembled. An immense bag of linen, lined with paper, and containing upwards of 23,000 cubic feet, was found to have a power of lifting about 500 pounds, including its own weight. The operation was begun by burning chopped straw and wool under the aperture of the machine, which immediately began to swell: and after being set at liberty ascended into the atmosphere. In ten minutes it had ascended 6000 feet; and when its force was exhausted it fell to the ground at the distance of 7668 feet from the place from whence it set out.

Soon after this one of the brothers arrived at Paris, where he was invited by the Academy of Sciences to repeat his experiments at their expence. In consequence of this invitation, he constructed, in a garden in the fauxbourg of St Germain, a large balloon of an elliptical form. In a preliminary experiment, this machine lifted up from the ground eight persons who held it, and would have carried them all off if more had not quickly come to their assistance. Next day the experiment was repeated in presence of the members of the academy; the machine was filled by the combustion of 50 pounds of straw made up in small bundles, upon which about 12 pounds of chopped wool were thrown at intervals. The usual success attended this exhibition: the machine soon swelled; endeavoured to ascend; and immediately after sustained itself in the air, together with the charge of between 400 and 500

pounds weight. It was evident that it would have ascended to a great height; but as it was designed to repeat the experiment before the king and royal family at Versailles, the cords by which it was tied down were not cut. But in consequence of a violent rain and wind which happened at this time, the machine was so far damaged, that it became necessary to prepare a new one for the time that it had been determined to honour the experiment with the royal presence; and such expedition was used, that this vast machine, of near 60 feet in height and 43 in diameter, was made, painted with water colours both within and without, and finely decorated, in no more than four days and four nights. Along with this machine was sent up a wicker cage, containing a sheep, a cock, and a duck, which were the first animals ever sent through the atmosphere. The full success of the experiment was prevented by a violent gust of wind which tore the cloth in two places near the top before it ascended; however, it rose to the height of 1440 feet; and after remaining in the air about eight minutes, fell to the ground at the distance of 10,200 feet from the place of its setting out. The animals were not in the least hurt.

Some animals safely sent thro' the air.

The great power of these aerostatic machines, and their very gradual descent in falling to the ground had originally showed that they were capable of transporting people through the air with all imaginable safety; and this was further confirmed by the experiment already mentioned. As M. Montgolfier, therefore, proposed to make a new aerostatic machine of a firmer and better construction than the former, M. Pilatre de Rozier offered himself to be the first aerial adventurer.

M. Pilatre de Rozier the first aerial navigator.

This new machine was constructed in a garden in the fauxbourg of St Antoine. It was of an oval shape, about 48 feet in diameter and 74 in height; elegantly painted on the outside with the signs of the zodiac, cyphers of the king's name, and other ornaments. A proper gallery, grate, &c. were appended in the manner afterwards described; so that it was easy for the person who ascended to supply the fire with fuel, and thus keep up the machine as long as he pleased. The weight of the whole apparatus was upwards of 1600 pounds. The experiment was performed on the 15th of October 1783. M. Pilatre having placed himself in the gallery, the machine was inflated, and permitted to ascend to the height of 84 feet, where he kept it afloat for about four minutes and a half: after which it descended very gently: and such was its tendency to ascend, that it rebounded to a considerable height after touching the ground. Two days after, he repeated the experiment with the same success as before; but the wind being strong, the machine did not sustain itself so well as formerly. On repeating the experiment in calmer weather, he ascended to the height of 210 feet. His next ascent was 262 feet; and in the descent, a gust of wind having blown the machine over some large trees of an adjoining garden, M. Pilatre suddenly extricated himself from so dangerous a situation, by throwing some straw and chopped wool on the fire, which raised him at once to a sufficient height. On descending again he once more raised himself to a proper height by throwing straw on the fire. Some time after, he ascended in company with

Account of his different voyages.

M. Girouard

M. Girond de Villette to the height of 330 feet; hovering over Paris at least nine minutes in sight of all the inhabitants, and the machine keeping all the while perfectly steady.

These experiments had shown, that the aerostatic machines might be raised or lowered at the pleasure of the persons who ascended: they had likewise discovered, that the keeping them fast with ropes was no advantage; but, on the contrary, that this was attended with inconvenience and hazard. On the 21st of November 1783, therefore, M. Pilatre determined to undertake an aerial voyage in which the machine should be fully set at liberty. Every thing being got in readiness, the balloon was filled in a few minutes; and M. Pilatre placed himself in the gallery, counterpoised by the marquis d'Arlandes, who occupied the other side. It was intended to make some preliminary experiments on the ascending power of the machine; but the violence of the wind prevented this from being done, and even damaged the balloon essentially; so that it would have been entirely destroyed had not timely assistance been given. The extraordinary exertions of the workmen, however, repaired it again in two hours, and the adventurers set out. They met with no inconvenience during their voyage, which lasted about 25 minutes; during which time they had passed over a space of above five miles.—From the account given by the marquis d'Arlandes, it appears that they met with several different currents of air; the effect of which was, to give a very sensible shock to the machine, and the direction of the motion seemed to be from the upper part downwards. It appears also that they were in some danger of having the balloon burnt altogether; as the marquis observed several round holes made by the fire in the lower part of it, which alarmed him considerably, and indeed not without reason. However, the progress of the fire was easily stopped by the application of a wet sponge, and all appearance of danger ceased in a very short time.

Montgolfier's machines succeeded by those filled with inflammable air.

Experiment of Messrs Charles and Roberts.

This voyage of M. Pilatre and the marquis d'Arlandes may be said to conclude the history of those aerostatic machines which are elevated by means of fire; for though many other attempts have been made upon the same principle, most of them have either proved unsuccessful or were of little consequence. They have therefore given place to the other kind filled with inflammable air (*hydrogen gas*); which, by reason of its smaller specific gravity, is both more manageable, and capable of performing voyages of greater length, as it does not require to be supplied with fuel like the others. This was invented a very short time after the discovery had been made by M. Montgolfier. This gentleman had indeed designed to keep his method in some degree a secret from the world; but as it could not be concealed, that a bag filled with any kind of fluid lighter than the common atmosphere would rise in it, inflammable air was naturally thought of as a proper succedaneum for the rarefied air of M. Montgolfier. The first experiment was made by two brothers Messrs Roberts, and M. Charles a professor of experimental philosophy. The bag which contained the gas was composed of lutestring, varnished over with a solution of the elastic gum called *caoutchouc*; and that with which they made their first essay was only about 13 English feet in

diameter. Many difficulties occurred in filling it with the inflammable air, chiefly owing to their ignorance of the proper apparatus; infomuch, that, after a whole day's labour from nine in the morning, they had got the balloon only one-third part full. Next morning they were surprised to find that it had fully inflated of itself during the night; but, upon inquiry, it was found, that they had inadvertently left open a stop-cock connected with the balloon, by which the common air gaining access, had mixed itself with the inflammable air; forming a compound still lighter than the common atmosphere, but not sufficiently light to answer the purposes of aerostation. Thus they were obliged to renew their operation; and, by six o'clock in the evening of next day, they found the machine considerably lighter than the common air; and, in an hour after, it made a considerable effort to ascend. The public exhibition, however, had been announced only for the third day after; so that the balloon was allowed to remain in an inflated state for a whole day; during which they found it had lost a power of ascent equal to about three pounds, being one-seventh part of the whole. When it was at last set at liberty, after having been well filled with inflammable air, it was 35 pounds lighter than an equal bulk of common air. It remained in the atmosphere only three quarters of an hour, during which it had traversed 15 miles. Its sudden descent was supposed to have been owing to a rupture which had taken place when it ascended into the higher regions of the atmosphere.

In what manner a balloon partly filled may inflate itself.

Loss of power in their balloon.

The success of this experiment, and the aerial voyage made by Messrs Rozier and Arlandes, naturally suggested the idea of undertaking something of the same kind with a balloon filled with inflammable air. The machine used on this occasion was formed of gores of silk, covered over with a varnish made of *caoutchouc*, of a spherical figure, and measuring $27\frac{1}{2}$ feet in diameter. A net was spread over the upper hemisphere, and was fastened to a hoop which passed round the middle of the balloon. To this a sort of car, or rather boat, was suspended by ropes, in such a manner as to hang a few feet below the lower part of the balloon: and, in order to prevent the bursting of the machine, a valve was placed in it; by opening of which some of the inflammable air might be occasionally let out. A long silken pipe communicated with the balloon, by means of which it was filled. The boat was made of basket work, covered with painted linen, and beautifully ornamented; being 8 feet long, 4 broad, and $3\frac{1}{2}$ deep; its weight 130 pounds. At this time, however, as at the former, they met with great difficulties in filling the machine with inflammable air, owing to their ignorance of the most proper apparatus. But at last, all obstacles being removed, the two adventurers took their seats at three quarters after one in the afternoon of the first of December 1783. Persons skilled in mathematics were conveniently stationed with proper instruments to calculate the height, velocity, &c. of the balloon. The weight of the whole apparatus, including that of the two adventurers, was found to be $604\frac{1}{2}$ pounds, and the power of ascent when they set out was 20 pounds; so that the whole difference betwixt the weight of this balloon and an equal bulk of common air was 624 pounds. But the weight of common atmosphere displaced by the inflammable gas was

First aerial voyage of Messrs Charles and Roberts.

was

Specific gravity of the inflammable air in this first voyage.

was calculated to be 771 pounds, so that there remains 147 for the weight of the latter; and this calculation makes it only $5\frac{1}{2}$ times lighter than common air.

At the time the balloon left the ground, the thermometer stood at 59° of Fahrenheit's scale; and the quicksilver in the barometer at 30.18 inches; and, by means of the power of ascent with which they left the ground, the balloon rose till the mercury fell to 27 inches, from which they calculated their height to be about 600 yards. By throwing out ballast occasionally as they found the machine descending by the escape of some of the inflammable air, they found it practicable to keep at pretty near the same distance from the earth during the rest of their voyage; the quicksilver fluctuating between 27 and 27.65 inches, and the thermometer between 53° and 57° , the whole time. They continued in the air for the space of an hour and three quarters, when they alighted at the distance of 27 miles from Paris: having suffered no inconvenience during their voyage, nor experienced any contrary currents of air, as had been felt by Mess. Pilatre and Arlandes. As the balloon still retained a great quantity of inflammable gas, Mr Charles determined to take another voyage by himself. Mr Robert accordingly got out of the boat, which was thus lightened by 130 pounds, and of consequence the aerostatic machine now had nearly as much power of ascent. Thus he was carried up with such velocity, that in twenty minutes he was almost 9000 feet high, and entirely out of sight of terrestrial objects. At the moment of his parting with the ground, the globe had been rather flaccid; but it soon began to swell, and the inflammable air escaped from it in great quantity through the silken tube. He also frequently drew the valve that it might be the more freely emitted, and the balloon effectually prevented from bursting. The inflammable gas being considerably warmer than the external air, diffused itself all round, and was felt like a warm atmosphere; but in ten minutes the thermometer indicated a variation of temperature as great as that between the warmth of spring and the ordinary cold of winter. His fingers were benumbed by the cold, and he felt a violent pain in his right ear and jaw, which he ascribed to the dilatation of the air in these organs as well as to the external cold. The beauty of the prospect which he now enjoyed, however, made amends for these inconveniencies. At his departure the sun was set on the valleys; but the height to which Mr Charles was got in the atmosphere, rendered him again visible, though only for a short time. He saw, for a few seconds, vapours rising from the valleys and rivers. The clouds seemed to ascend from the earth, and collect one upon the other, still preserving their usual form; only their colour was gray, and monotonous for want of sufficient light in the atmosphere. By the light of the moon, he perceived that the machine was turning round with him in the air; and he observed that there were contrary currents which brought him back again. He observed also, with surprise, the effects of the wind, and that the streamers of his banners pointed upwards; which, he says, could not be the effect either of his ascent or descent, as he was moving horizontally at the time. At last, recollecting his promise of returning to his friends in half an hour, he pulled the valve, and

Mr Charles ascends by himself.

Has a pain in his ear and jaw when in the higher regions.

Various currents of wind and eddies in these regions.

Streamers of his banners stand upwards.

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accelerated his descent. When within 200 feet of the earth, he threw out two or three pounds of ballast, which rendered the balloon again stationary; but, in a little time afterwards, he gently alighted in a field about three miles distant from the place whence he set out; though, by making allowance for all the turnings and windings of the voyage, he supposes that he had gone through nine miles at least. By the calculations of M. de Mennier, he rose at this time not less than 10,500 feet high; a height somewhat greater than that of Mount *Ætna*. A small balloon, which had been sent off before the two brothers set out on their voyage, took a direction opposite to that of the large one, having met with an opposite current of air, probably at a much greater height.

The subsequent aerial voyages differ so little from that just now related, that any particular description of them seems to be superfluous. It had occurred to Mr Charles, however, in his last flight, that there might be a possibility of directing the machine in the atmosphere; and this was soon attempted by Mr Jean Pierre Blanchard, a gentleman who had, for several years before, amused himself with endeavours to fly by mechanical means, though he had never succeeded in the undertaking. As soon as the discovery of the aerostatic machines was announced, however, he resolved to add the wings of his former machine to a balloon, and made no doubt that it would then be in his power to direct himself through the air at pleasure. In his first attempt he was frustrated by the impetuosity of a young gentleman, who insisted, right or wrong, on ascending along with him. In the scuffle which ensued on this occasion, the wings and other apparatus were entirely destroyed; so that M. Blanchard was obliged to commit himself to the direction of the wind; and in another attempt it was found, that all the strength he could apply to the wings was scarce sufficient to counteract the impression of the wind in any degree. In his voyage, he found his balloon, at a certain period, acted upon by two contrary winds; but, on throwing out four pounds of ballast, he ascended to a place where he met with the same current he had at setting out from the earth. His account of the sensations he felt during this voyage, was somewhat different from that of Mr Charles; having, in one part of it, found the atmosphere very warm, in another cold; and having once found himself very hungry, and at another time almost overcome by a propensity to sleep. The height to which he arose, as measured by several observations with mathematical instruments, was thought to be very little less than 10,000 feet; and he remained in the atmosphere an hour and a quarter.

Attempts to guide aerostatic machines in the atmosphere.

Two first voyages of M. Blanchard.

His sensations while in the atmosphere.

The attempts of Mr Blanchard to direct his machine through the atmosphere, were repeated in the month of April 1784 by Mess. Morveau and Bertrand, at Dijon, who raised themselves with an inflammable-air balloon to the height, as it was thought, of 13,000 feet; passing through a space of 18 miles in an hour and 25 minutes. Mr Morveau had prepared a kind of oars for directing the machine through the air; but they were damaged by a gust of wind, so that only two of them remained serviceable; by working these, however, they were able to produce a sensible effect on the motion of the machine. In a third aerial voyage performed by Mr Blanchard, he seemed to pro-

Voyage of Mess. Morveau and Bertrand.

Third voyage of M. Blanchard.

duce some effect by the agitation of his wings, both in ascending, descending, moving sideways, and even in some measure against the wind; however, this is supposed, with some probability, to have been a mistake, as, in all his succeeding voyages, the effects of his machinery could not be perceived.

Second voyage of Messrs Charles and Robert.

The success of Messrs Charles and Robert in their former experiments, encouraged them soon to repeat them, with the addition of some machinery to direct their course. Having enlarged their former balloon to the size of an oblong spheroid $46\frac{1}{2}$ feet long and $27\frac{1}{2}$ in diameter, they made it to float with its longest part parallel to the horizon. The wings were made in the shape of an umbrella without the handle, to the top of which a stick was fastened parallel to the aperture of the umbrella. Five of these were disposed round the boat, which was near 17 feet in length. The balloon was filled in three hours, and, with the addition of 450 pounds of ballast, remained in *equilibrio* with the atmosphere. About noon, on the 19th of September 1784, they began to ascend very gently in consequence of throwing out 24 pounds of ballast, but were soon obliged to throw out eight pounds more, in order to avoid running against some trees. Thus they rose to the height of 1400 feet, when they perceived some thunder clouds near the horizon. On this they ascended and descended, to avoid the danger, as the wind blew directly towards the threatening clouds; but, from the height of 600 feet to that of 4200 above the surface of the earth, the current was quite uniform and in one direction. During their voyage they lost one of their oars; but found, that by means of those which remained, they considerably accelerated their course. From the account of their voyage, it would seem that they had passed safely through the thunder clouds; as we are informed, that, about 40 minutes after three, they heard a loud clap of thunder; and three minutes after, another much louder; at which time the thermometer sunk from 77 to 59 degrees. This sudden cold, occasioned by the approach of the clouds, condensed the inflammable air so that the balloon descended very low, and they were obliged to throw out 40 pounds of ballast; yet on examining the heat of the air within the balloon, they found it to be 104° , when that of the external atmosphere was only 63° . When they had got so high that the mercury in the barometer stood only at 23.94 inches, they found themselves becalmed; so that the machine did not go even at the rate of two feet in a second, though it had before gone at the rate of 24 feet in a second. On this they determined to try the effect of their oars to the utmost; and, by working them for 35 minutes, and marking the shadow of the balloon on the ground, they found, in that time, that they had described the segment of an ellipsis whose longest diameter was 6000 feet. After having travelled about 150 miles, they descended, only on account of the approach of night, having still 200 pounds of ballast left.

Are in danger of running into thunder clouds.

Heat of the air within their balloon.

Effect of their oars in moving the machine.

Their conclusion, with regard to the effect of their wings, is as follows: "Those experiments show, that far from going against the wind, as is said by some persons to be possible in a certain manner, and some aeronauts pretend to have actually done, we only obtained, by means of two oars, a deviation of 22 degrees: it is certain, however, that if we could have

used our four oars, we might have deviated about 40 degrees from the direction of the wind; and as our machine would have been capable of carrying seven persons, it would have been easy for five persons to have gone, and to have put in action eight oars, by means of which a deviation of about 80 degrees would have been obtained.

"We have already observed (say they), that if we did not deviate more than 22 degrees, it was because the wind carried us at the rate of 24 miles an hour; and it is natural to judge, that, if the wind had been twice as strong as it was, we should not have deviated more than one-half of what we actually did; and, on the contrary, if the wind had been only half as strong, our deviation would have been proportionably greater."

Having thus related all that has been done with regard to the conducting of aerostatic machines through the atmosphere, we shall now relate the attempts that have been made to lessen their expence by falling upon some contrivance to ascend without throwing out ballast, and to descend without losing any of the inflammable air. The first attempt of this kind was made by the duke de Chartres; who, on the 15th of July 1784, ascended with the two brothers, Roberts, and a fourth person, from the Park of St Cloud. The balloon was of an oblong form, made to ascend with its longest diameter horizontally, and measured 55 feet in length and 24 in breadth. It contained within it a smaller balloon filled with common air; by blowing into which with a pair of bellows, and thus throwing in a considerable quantity of common air, it was supposed that the machine would become sufficiently heavy to descend, especially as, by the inflation of the internal bag, the inflammable air in the external one would be condensed into a smaller space, and thus become specifically heavier. The voyage, however, was attended with such circumstances as rendered it impossible to know what would have been the event of the scheme. The power of ascent with which they set out, seems to have been very great; as, in three minutes after parting with the ground, they were lost in the clouds, and involved in such a dense vapour that they could see neither in sky nor the earth. In this situation they seemed to be attacked by a whirlwind, which, besides turning the balloon three times round from right to left, struck and beat it so about, that they were rendered incapable of using any of the means proposed for directing their course, and the silk stuff of which the helm had been composed was even torn away. No scene can be conceived more terrible than that in which they were now involved. An immense ocean of shapeless clouds rolled one upon another below them, and seemed to prevent any return to the earth, which still continued invisible, while the agitation of the balloon became greater every moment. In this extremity they cut the cords which held the interior balloon, and of consequence it fell down upon the aperture of the tube that came from the large balloon into the boat, and stopped it up. They were then driven upwards by a gust of wind from below, which carried them to the top of that stormy vapour in which they had been involved. They now saw the sun without a cloud; but the heat of his rays, with the diminished density of the atmosphere had such an effect on the inflammable air, that the balloon seemed every

Contrivances used to prevent the waste of inflammable air.

Voyage of the duke de Chartres.

Is involved in dark clouds, and attacked by a whirlwind.

every moment ready to burst. To prevent this they introduced a stick through the tube, in order to push away the inner balloon from its aperture: but the expansion of the inflammable air pushed it so close, that all attempts of this kind proved ineffectual. It was now, however, become absolutely necessary to give vent to a very considerable quantity of the inflammable air; for which purpose the duke de Chartres himself bored two holes in the balloon, which tore open for the length of seven or eight feet. On this they descended with great rapidity; and would have fallen into a lake, had they not hastily thrown out 60 pounds of ballast, which enabled them just to reach the water's edge.

The success of the scheme for raising or lowering aerostatic machines by means of bags filled with common air being thus rendered dubious, another method was thought of. This was to put a small aerostatic machine with rarefied air under an inflammable air balloon, but at such a distance that the inflammable air of the latter might be perfectly out of the reach of the fire used for inflating the former; and thus, by increasing or diminishing the fire in the small machine, the absolute weight of the whole would be considerably diminished or augmented. This scheme was unhappily put in execution by the celebrated M. Pilatre de Rozier, and another gentleman named Mr Romaine. Their inflammable air balloon was about 37 feet in diameter, and the power of the rarefied-air one was equivalent to about 60 pounds. They ascended without any appearance of danger or sinister accident: but had not been long in the atmosphere when the inflammable air balloon was seen to swell very considerably, at the same time that the aeronauts were observed, by means of telescopes, very anxious to get down, and busied in pulling the valve and opening the appendages to the balloon, in order to facilitate the escape of as much inflammable air as possible. A short time after this the whole machine was on fire, when they had then attained the height of about three quarters of a mile from the ground. No explosion was heard; and the silk which composed the air balloon continued expanded, and seemed to resist the atmosphere for about a minute; after which it collapsed, and the remains of the apparatus descended along with the two unfortunate travellers so rapidly, that both of them were killed. Mr Pilatre seemed to have been dead before he came to the ground; but Mr Romaine was alive when some persons came up to the place where he lay, though he expired immediately after.

These are the most remarkable attempts that have been made to improve the science of aerostation; though a great number of other expeditions through the atmosphere have taken place. But of all the voyages which had been hitherto projected or put in execution, the most daring was that of Mr Blanchard and Dr Jeffries across the straits of Dover, which separate Britain from France. This took place on the 7th of January 1785, being a clear frosty morning, with a wind, barely perceptible, at N. N. W. The operation of filling the balloon began at 10 o'clock, and, at three quarters after 12, every thing was ready for their departure. At one o'clock Mr Blanchard desired the boat to be pushed off, which now stood only two feet distant from that precipice so finely described by Shakespeare in his tragedy of King Lear. As the balloon

was scarcely sufficient to carry two, they were obliged to throw out all their ballast except three bags of 10 pounds each; when they at last rose gently; though making very little way on account of there being so little wind. At a quarter after one o'clock, the barometer, which on the cliff stood at 29.7 inches, was now fallen to 27.3, and the weather proved fine and warm. They had now a most beautiful prospect of the south coast of England, and were able to count 37 villages upon it. After passing over several vessels, they found that the balloon, at 50 minutes after one, was descending, on which they threw out a sack and a half of ballast; but as they saw that it still descended, and with much greater velocity than before, they now threw out all the ballast. This still proving ineffectual, they next threw out a parcel of books they carried along with them, which made the balloon ascend, when they were about midway betwixt France and England. At a quarter past two, finding themselves again descending, they threw away the remainder of their books, and, ten minutes after, they had a most enchanting prospect of the French coast. Still, however, the machine descended; and as they had now no more ballast, they were obliged to throw away their provisions, the wings of their boat, and every thing they could possibly spare. "We threw away (says Dr Jeffries) our only bottle, which, in its descent cast out a steam like smoke, with a rushing noise; and when it struck the water, we heard and felt the shock very perceptibly on our ear and balloon." All this proving insufficient to stop the descent of the balloon, they next threw out their anchors and cords, and at last stripped off their clothes, fastening themselves to certain slings, and intending to cut away the boat as their last resource. They had now the satisfaction, however, to find that they were rising; and as they passed over the high lands between Cape Blanc and Calais the machine rose very fast, and carried them to a greater height than they had been at any former part of their voyage. They descended safely among some trees in the forest of Guennes, where there was just opening enough to admit them.

It would be tedious as well as unnecessary to recount all the other aerial voyages that have been performed in our own or other countries: It appeared sufficient for the purpose of this article to notice those which were most remarkable and interesting; and therefore an account of the ingenious Mr Baldwin's excursion from Chester, alluded to above, must not be omitted in our enumeration.

On the 8th of September 1785, at forty minutes past Baldwin's
one P. M. Mr Baldwin ascended from Chester in Mr Lunardi's balloon. After traversing in a variety of different directions, he first alighted, at 28 minutes after three, about twelve miles from Chester, in the neighbourhood of Frodsham; then reascending and pursuing his excursion, he finally landed at Rixton moss, five miles N. N. E. of Wavington, and 25 miles from Chester. Mr Baldwin has published his Observations and Remarks made during his voyage, and taken from minutes. Our limits will not admit of relating many of his observations; but the few following are some of the most important and curious. "The sensation of ascending is compared to that of a strong pressure from the bottom of the ear upwards against

Unfortunate voyage and death of Messrs Rozier and Romaine.

Voyage of Messrs Blanchard and Jeffries across the straits of Dover.

the soles of his feet. At the distance of what appeared to him seven miles from the earth, though by the barometer scarcely a mile and a half, he had a grand and most enchanting view of the city of Chester and its adjacent places below. The river Dee appeared of a red colour; the city very diminutive; and the town entirely blue. The whole appeared a perfect plain, the highest building having no apparent height, but reduced all to the same level; and the whole terrestrial prospect appeared like a coloured map. Just after his first ascent, being in a well watered and maritime part of the country, he observed a remarkable and regular tendency of the balloon towards the sea; but shortly after rising into another current of air, he escaped the danger: this upper current he says, was visible to him at the time of his ascent, by a lofty sound stratum of clouds flying in a safe direction. The perspective appearance of things to him was very remarkable. The lowest bed of vapour that first appeared as cloud was pure white, in detached fleeces, increasing as they rose: they presently coalesced, and formed, as he expresses it, a sea of cotton, tufting here and there by the action of the air in the undisturbed part of the clouds. The whole became an extended white floor of cloud, the upper surface being smooth and even. Above this white floor he observed, at great and unequal distances, a vast assemblage of thunder clouds, each parcel consisting of whole acres in the densest form: he compares their form and appearance to the smoke of pieces of ordnance, which had consolidated as it were into masses of snow, and penetrated through the upper surface or white floor of common clouds, there remaining visible and at rest. Some clouds had motions in flow and various directions, forming an appearance truly stupendous and majestic." He endeavours to convey some idea of the scene by a figure; (and from this fig. 1. Plate II. is copied). *A* represents a circular view he had from the car of the balloon, himself being over the centre of the view, looking down on the white floor of clouds and seeing the city of Chester through an opening, which discovered the landscape below, limited by surrounding vapour to less than two miles in diameter. The breadth of the outer margin defines his apparent height in the balloon (viz. 4 miles) above the white floor of clouds. Mr Baldwin also gives a curious description of his tracing the shadow of the balloon over tops of volumes of clouds. At first it was small, in size and shape like an egg; but soon increased to the magnitude of the sun's disc, still growing larger, and attended with a most captivating appearance of an iris encircling the whole shadow at some distance round it, the colours of which were remarkably brilliant. The regions did not feel colder, but rather warmer than below. The sun was hottest to him when the balloon was stationary. The discharge of a cannon when the balloon was at a considerable height, was distinctly heard by the aeronaut; and a discharge from the same piece, when at the height of 30 yards, so disturbed him as to oblige him for safety to lay hold firmly of the cords of the balloon. At a considerable height he poured down a pint bottle full of water; and as the air did not oppose a resistance sufficient to break the steam into small particles, it mostly fell down in large drops. In the course of the balloon's track it was found much affected by the water (a circumstance ob-

View from
the balloon.

Appearance
of the
clouds.

erved in former aerial voyages). At one time the direction of the balloon kept continually over the water, going directly towards the sea, so much as to endanger the aeronaut; the mouth of the balloon was opened, and in two minutes he descended into an under current blowing from the sea: he kept descending, and landed at Bellair farm in Rinsley, 12 miles from Chester. Here he lightened his car by 31 pounds, and instantly reascending, was carried into the interior part of the country, performing a number of different manœuvres. At his greatest altitude he found his respiration free and easy. Several bladders which he had along with him crackled and expanded very considerably. Clouds and land, as before, appeared on the same level. By way of experiment, he tried the upper valve two or three times, the neck of the balloon being close; and remarked, that the escape of the gas was attended with a growling noise like millstones, but not near so loud. Again, round the shadow of the balloon, on the clouds he observed the iris. A variety of other circumstances and appearances he met with, is fancifully described; and at 53 minutes past three he finally landed.

The following is an account of an establishment formed in France during the late war for the improvement of aerial navigation:

"The aerostatic institute, founded by the committee of public safety, and enveloped in the most profound secrecy at Meudon, to which also was added a camp for the exercise of the artillery, is even yet looked upon as a secret arrangement of the republic, respecting which the greatest precautions are taken; the doors being shut against the public and all foreigners.

Aerostatic
institute in
France.

It was impossible to have selected a more convenient spot for the establishment of the aeronautic institute than the royal lodge of Meudon. From its elevated site on a mountain, it commands a beautiful and extensive prospect over a plain covered with villages and cultivated fields, intersected by the Seine, and terminated by the city of Paris.

The perfection and the rational application of aerostatics are the objects of the labours of this establishment, to which the celebrated natural philosopher Guyton Morveau has in particular rendered the most important services. But the institution stood in need of such a director as Conté, for whom Guyton Morveau has procured the appointment. With a love of the science Conté unites a penetrating genius for research and invention, accompanied by indefatigable assiduity.

The corps of aeronauts, intended to serve in the armies of the republic, and consisting of fifty courageous youths, is trained at the school of Meudon: it is there the balloons are prepared which are sent off to the armies; and every day in summer the pupils are employed, at one time in performing their exercises, at another in making researches, in natural philosophy, with a balloon which is kept constantly filled for the purpose.

Employment of the
pupils.

The improvement in the preparation of the balloon, the discovery of a new mode of filling it with inflammable air from the substance of water (hydrogen gas), discovered by Lavoisier, the invention of a new telegraph, connected with the balloon, are the principal advances which have been made in aerostatics at Meudon under the direction of Conté.

The

The old lodge of Meudon serves as a manufactory for the preparation of the balloons, and of all the apparatus necessary to accompany them to the armies. The new lodge is appropriated to the institute, and to the accommodation of the pupils, and of the director and his family. There were prepared the *Entreprenant* for the army of the north, by means of which the hostile army was reconnoitred at the battle of Fleurus; the *Céleste* for the army of the Sambre and Maese; the *Hercule* and the *Intrépide* for the army of the Rhine and Moselle.

Mode of preparing the balloons.

The silk for the balloons is manufactured at Lyons, and is very thick and strong: and Conté has rendered them much more durable by the precaution of only varnishing the outer surface. The varnish is of an excellent quality; it sufficiently hardens the outside, and does not make the silk stick together when the balloon is folded. Moreover experience has proved that the inner coat of varnish cannot resist the operation of filling the balloon, that it is corroded by the gas, and that this friction renders the silk flabby.

The filling of the balloon with hydrogen gas is the result of the discoveries made by the great Lavoisier, and has for its basis his important experiment of the decomposition of water. The gas is prepared by the following simple and unexpensive process.

The gas.

Six or more hollow iron cylinders are set in brick work, beside and over each other, in a furnace which may be constructed in twelve hours; and both ends of each cylinder are made to project from the furnace. The openings of these cylinders are stopped with strong iron covers, through which metal tubes are let in. The tube at one end serves for pouring water, previously heated, into the cylinders when red hot; that on the opposite side is destined to conduct the air which first presents itself, through a reservoir filled with a caustic lixivium, and to convey it into the balloon. The cylinders are partly filled with coarse iron filings, which the excessive heat of the furnace, kept up with pit coal during the whole time of the operation, reduces to a state of exandescence. At this stage of the process, the valve of one of the tubes of each cylinder is opened, and a small quantity of boiling water is gently poured into the heated cylinder. As soon as the vapour of the water touches the heated iron, the two substances which compose the water are separated: the one (the oxygen) attaches itself to the iron, which it calcines, and which, after the operation, is found partly crystallized, after the manner of volcanic productions: the other of the component substances of the water (the hydrogen) combines with a quantity of the igneous substance termed *calorique*, and becomes inflammable air (hydrogen gas), which continues in a permanent state of elastic fluidity, and weighs seven or eight times less than the atmospheric air.

As the water contains a small portion of the substance of *carbone* (*carbonique*) which would render the air in the balloon heavy, the air, as it first rushes out of the cylinders is made to pass through a reservoir of water impregnated with a caustic alkali. This fluid attracts to itself all the *carbonique*, and nothing rises into the balloon but very pure and inflammable air.

During the operation, it has sometimes happened that the cylinders, heated to exandescence, melted. To guard against this accident, the projecting end of the

cylinder is furnished with a pyrometer, and a scale, which, by means of an iron rod, indicates the degrees of rarefaction of the air. A particular point on the scale announces the moment when the cylinders are heated in the degree nearest to fusion: when such is the case, the fire is immediately diminished. The operation of filling a balloon of thirty feet diameter employs one third of a day.

The exercising balloon at Meudon is of a spherical form, and thirty-two feet in diameter. Its upper half is covered with a linen case to keep off the rain from the balloon and its netting. This netting, woven with strong cords, embraces the upper part of the balloon, and is destined to support the car for the reception of the aeronauts. The balloon, kept constantly full and ready for ascent, and exposed in the open air in all weathers, preserves its buoyant station in the atmosphere, being fastened on the great terrace of the lodge. When the weather is favourable, the aeronautic exercises are begun. The balloon is set free from its fastenings, and elevated to a certain height; when the car is made fast to the cords which hang down from the net: the whole of this is done in five minutes. A colonel then mounts the car with one of the pupils, and the balloon rises to the height, generally, of from a hundred and sixty to two hundred and forty yards. The pupils separate into divisions, for the purpose of holding the balloon in the air, suffering it to mount, and drawing it down, by means of three principal ropes fastened to the net, and ramified with several others: in these manœuvres they employ the aid of a capstern. When the balloon has been newly filled, has yet suffered no evaporation, and still retains all its force, it requires the strength of twenty persons to hold it; and in that state it will bear eight hundred weight. After a space of two months, though much evaporated, it is still capable of bearing two persons with their instruments, and even a considerable ballast, at the same height in the air: but then ten persons are sufficient to hold it.

The car is constructed of a light lattice work of wood, lined with prepared leather, and hangs about sixteen feet beneath the balloon: it affords convenient room for two persons seated opposite each other, with the necessary instruments for making observations.

The balloon ascends as often in the day as is requisite for the succession of observations which are to be made; but these ascents take place only in calm and serene weather. Whenever any unforeseen accident occurs, the aerial machine is hauled down in five minutes. In strong gusts of wind which suddenly arise, the aeronauts are always exposed to some danger: the balloon, held by the ropes, cannot rise freely; and its vibrations and fluctuation resemble those of a paper kite which has not yet reached a certain degree of altitude. This spectacle, nevertheless, is more terrific to the spectator than to the aeronaut, who, seated in his car which its own weight preserves in a perpendicular position under the balloon, is but slightly affected by its desultory motion. No instance of any unfortunate accident has yet occurred at Meudon.

All fear, all idea of danger, vanishes on examining the solidity of the whole apparatus, the precautionary measures adopted with the most prudent foresight and the utmost security, and especially when we are more particularly

particularly acquainted with the cool unassuming steadiness of Conté, the director of the whole.

When the return of peace shall allow more leisure, and shall favour the employment of this apparatus in other experiments than those immediately connected with the military service, we may expect to derive from it the most important and diversified advantages to natural science. The experiments will then be conducted under the direction of a committee of naturalists from the national institute, with a view of making discoveries in natural philosophy, meteorology, and other branches. When the labours of the aerostatic institute shall have accomplished ends so important to the arts, and of so great general utility, there will be printed a particular account of the establishment, and of the course of experiments pursued: at present, these matters are kept from the knowledge of the public.

Utility of aerostatic experiments.

Aerostatic telegraph.

The most recent invention of Conté, admirable for its simplicity and precision, is the aerostatic telegraph. It consists of eight cylinders of varnished black silk, stretched on hoops, and resembling those little pocket lanterns of crimped paper, which draw out and fold down again on themselves. These eight moveable cylinders, each three feet in diameter, and of a proportionate length, are suspended from the bottom of the car, connected together with cords, and hanging one above another, at the distance of four feet. By means of cords passing through the bottom of the car, the aeronautic observers direct those cylinders, give them different positions at will, and thus carry on their telegraphic correspondence from the regions of the air.

Conté has further applied his thoughts to the invention of a similar aerostatic telegraph, which, without the assistance of a great balloon, or an aerial correspondent, should be managed by a person standing on the ground, by means of cords; the apparatus being suspended to a small balloon, of only twelve feet diameter.

Ascent of a balloon at the battle of Fleurus.

Coutel, captain of the aeronautic corps, was the man who ascended with the *Entreprenant* balloon on the 26th of June, 1794, and who conducted the wonderful and important service of reconnoitring the hostile armies at the battle of Fleurus, accompanied by an adjutant and a general. He ascended twice on that day, to observe, from an elevation of four hundred and forty yards, the position and manœuvres of the enemy. On each occasion he remained four hours in the air, and, by means of preconcerted signals with flags, carried on a correspondence with General Jourdan, the commander of the French army.

His intended ascent had been made known to the enemy, who, at the moment when the balloon began to take its flight, opened the fire of a battery against the aeronauts. The first volley was directed too low: one ball, nevertheless, passed between the balloon and the car, and so near to the former, that Coutel imagined it had struck it. When the subsequent discharges were made, the balloon had already reached such a degree of altitude, as to be beyond the reach of cannon shot, and the aeronauts saw the balls flying beneath the car. Arrived at their intended height, the observers, remote from danger, and undisturbed, viewed all the evolutions of the enemies, and, from the peaceful regions of the air, commanded a distinct and com-

prehensive prospect of two formidable armies engaged in the work of death." (*Month. Mag.* vol. vi. p. 337.)

On the 28th of June, 1802, M. Garnerin, a French aeronaut, in company with an English gentleman, ascended in a balloon of 20 feet diameter from Ranelagh gardens. They passed over London, rose to the height of 10,000 feet, and landed in three quarters of an hour from the time of their ascent on a common near Colchester, a distance of near 60 miles from London. The temperature of the air when they ascended to the clouds was 15 degrees lower than on the surface of the earth; but when they rose above the clouds, it became sensibly milder. The rapidity of M. Garnerin's voyage is unequalled in the history of aerostation.

Garnerin's voyage in England remarkable for its rapidity.

The frequency of aerial voyages, accompanied with particular details of trifling and uninteresting circumstances, and apparently made with a view to promote the interest of particular persons, regardless of any advancement in knowledge, had sunk the science of aerostation so low in the opinion of most people, that before we give an account of the most proper methods of constructing these machines, it is necessary to premise something concerning the uses to which they may possibly be applied. These, according to Mr Cavallo, are the following:—

Uses of aerostation.

"The small balloons, especially those made of paper, and raised by means of spirit of wine, may serve to explore the direction of the winds in the upper regions of the atmosphere, particularly when there is a calm below; they may serve for signals in various circumstances, in which no other means can be used; and letters or other small things may be easily sent by them, as for instance from ships that cannot safely land on account of storms, from besieged places, islands, or the like. The larger aerostatic machines may answer all the above mentioned purposes in a better manner; and they may, besides, be used as a help to a person who wants to ascend a mountain, a precipice, or to cross a river; and perhaps one of these machines tied to a boat by a long rope, may be, in some cases, a better sort of sail than any that is used at present. The largest sort of machines, which can take up one or more men, may evidently be subservient to various economical and philosophical purposes. Their conveying people from place to place with great swiftness, and without trouble, may be of essential use, even if the art of guiding them in a direction different from that of the wind should never be discovered. By means of those machines the shape of certain seas and lands may be better ascertained; men may ascend to the tops of mountains they never visited before; they may be carried over marshy and dangerous grounds; they may by that means come out of a besieged place, or an island; and they may, in hot climates, ascend to a cold region of the atmosphere, either to refresh themselves, or to observe the ice, which is never seen below; and, in short, they may be thus taken to several places, to which human art hitherto knew of no conveyance.

"The philosophical uses, to which these machines may be subservient, are numerous indeed: and it may be sufficient to say, that hardly any thing which passes in the atmosphere is known with precision, and that principally for want of a method of ascending into it. The formation of rain, of thunder storms, of vapours, hail,

hail, snow, and meteors in general, require to be attentively examined and ascertained. The action of the barometer, the refraction and temperature of the air in various regions, the descent of bodies, the propagation of sound, &c. are subjects which all require a series of observations and experiments, the performance of which could never have been properly expected before the discovery of aerostatic machines."

To those uses we may add the gratification of curiosity and pleasure as a very strong inducement to the practice of an art, in which, with any tolerable degree of caution, there appears not to be the smallest danger. Every one who has tried the experiment testifies, that the beauty of the prospect afforded by an ascent, or the pleasure of being conveyed through the atmosphere, cannot be exceeded. No one has felt the least of that giddiness consequent upon looking from the top of a very high building or of a precipice, nor have they any of the sickness arising from the motion of a vessel at sea. Many have been carried by balloons at the rate of 30, 40, or even 50 miles an hour, without feeling the least inconvenience, or even agitation of the wind; the reason of which is, that as the machine moves with nearly the velocity of the wind itself, they are always in a calm, and without uneasiness. Some have apprehended danger from the electricity of the atmosphere; and have thought, that a stroke of lightning, or the smallest electric spark, happening near a balloon, might set fire to the inflammable air, and destroy both the machine and the adventurers. Mr Cavallo has suggested several considerations for diminishing apprehensions of this kind. Balloons have been already raised in every season of the year, and even when thunder has been heard, without injury. In case of danger, the aeronauts may either descend to the earth, or ascend above the region of the clouds and thunder storms. Besides as balloons are formed of materials that are not conductors of electricity, they are not like to receive strokes, especially as by being encompassed with air, they stand insulated. Moreover, inflammable air by itself, or unmixed with a certain quantity of common air, will not burn; so that if an electric spark should happen to pass through the balloon, it would not set fire to the inflammable air, unless a hole was made in the covering.

Principles of aerostation.

Experiments showing the impulse of heated air.

The general principles of aerostation are so little different from those of hydrostatics, that it may seem superfluous to insist much upon them. It is a fact universally known, that when a body is immersed in any fluid, if its weight be less than an equal bulk of that fluid, it will rise to the surface; but if heavier, it will sink; and if equal, it will remain in the place where it is left. For this reason smoke ascends into the atmosphere, and heated air in that which is colder. The ascent of the latter is shown in a very easy and satisfactory manner by bringing a red hot iron under one of the scales of a balance, by which the latter is instantly made to ascend; for as soon as the red hot iron is brought under the scale, the hot air being lighter than that which is colder, ascends, and strikes the bottom, which is thus impelled upwards, and the opposite scale descends, as if a weight had been put into it.

Upon this simple principle depends the whole theory of aerostation; for it is the same thing whether we render the air lighter by introducing a quantity of

heat into it, or enclosing a quantity of gas specifically lighter than the common atmosphere in a certain space; both will ascend, and for the same reason. A cubic foot of air, by the most accurate experiments, has been found to weigh about 554 grains, and to be expanded by every degree of heat, marked on Fahrenheit's thermometer, about $\frac{1}{750}$ th part of the whole. By heating a quantity of air, therefore, to 500 degrees of Fahrenheit, we shall just double its bulk when the thermometer stands at 54 in the open air, and in the same proportion we shall diminish its weight; and if such a quantity of this hot air be enclosed in a bag, that the excess of the weight of an equal bulk of common air weighs more than the bag with the air contained in it, both the bag and air will rise into the atmosphere, and continue to do so until they arrive at a place where the external air is naturally so much rarefied that the weight becomes equal: and here the whole will float.

The power of hot air in raising weights, or rather that by which it is itself impelled upwards, may be shown in the following manner: Roll up a sheet of paper into a conical form, and, by thrusting a pin into it near the apex, prevent it from unrolling. Fasten it then, by its apex, under one of the scales of a balance by means of a thread, and, having properly counterpoised it by weights, put it into the opposite scale; apply the flame of a candle underneath, you will instantly perceive the cone to arise, and it will not be brought into equilibrium with the other but by a much greater weight than those who have never seen the experiment would believe. If we try this experiment with more accuracy, by getting proper receptacles made which contain determinate quantities of air, we shall find that the power of the heat depends much more on the capacity of the bag which contains it than could well be supposed. Thus, let a cubical receptacle be made of a small wooden frame covered with paper capable of containing one foot of air, and let the power of a candle be tried with this as above directed for the paper cone. It will then be found that a certain weight may be raised; but a much greater one will be raised by having a receptacle of the same kind which contains two cubic feet; a still greater by one of three feet; a yet greater by one of four feet, &c. and this even though the very same candle be made use of; nor is it known to what extent even the power of this small flame might be carried.

From these experiments it appears, that in the aerostatic machines constructed on Montgolfier's plan, it must be an advantage to have them as large as possible; because a smaller quantity of fire will then have a greater effect in raising them, and the danger from that element, which in this kind of machines is chiefly to be dreaded, will be in a great measure avoided. On this subject it may be remarked, that as the cubical contents of a globe, or any other figure of which balloons are made, increase much more rapidly than their surfaces, there must ultimately be a degree of magnitude at which the smallest imaginable heat would raise any weight whatever. Thus, supposing any aerostatic machine capable of containing 500 cubic feet, and the air within it to be only one degree hotter than the external atmosphere; the tendency of this machine to rise, even without the application of artificial heat, would

Rarefied air balloons ought to be made as large as possible.

How balloons might rise by the common heat of the atmosphere.

be near an ounce. Let its capacity be increased 16 times; and the tendency to arise will be equivalent to a pound, though this may be done without making the machine 16 times heavier than before. It is certain, however, that all aerostatic machines have a tendency to produce or preserve heat within them, which would by no means be imagined by those who have not made the experiment. When Messrs Charles and Roberts made their longest aerial voyage of 150 miles, they had the curiosity to try the temperature of the air within their balloon, in comparison with that of the external atmosphere; and at this time they found, that, when the external atmosphere was 63° , the thermometer within the balloon stood at 104° . Such a difference of temperature must have given a machine of the magnitude which carried them a considerable ascending power independent of any other cause, as it amounted to 41 grains on every cubic foot; and therefore in a machine containing 50,000 such feet would have been almost 200 pounds. Hence we may easily account for what happened at Dijon, and is recorded by Mr Morveau. "A balloon, intended to be filled with inflammable air, being completed, was, by way of trial, filled with common air, and in that state exposed to the atmosphere. Now it was observed, and indeed a similar observation had been made before, that the air within the balloon was much hotter than the circumambient air: the thermometer in the former stood at 120° ; whereas in the latter, even when the sun shone upon it, the thermometer stood at 84° . This showed a considerable degree of rarefaction within the balloon; and consequently it was suspected, that, by means of this rarefaction alone, especially if it were to increase a little, the balloon might ascend. On the 30th of May, about noon, the wind being rather strong, agitated the balloon so that two men were employed to take care of it; but, notwithstanding all their endeavours, it escaped from its confinement; and, lifting up about 65 pounds weight of cords, equatorial circle, &c. rose many feet high, and, passing over some houses, went to the distance of 250 yards, where at length it was properly secured."

A balloon at Dijon rises thus into the atmosphere.

Internal heat of the balloons has great influence on aerial voyages.

This difference between the external and internal heat being so very considerable, must have a great influence upon aerostatic machines, and will undoubtedly influence those filled with inflammable air as well as the other kind. Nor is it unlikely, that the short time which many aerial voyagers have been able to continue in the atmosphere may have been owing to the want of a method of preserving this internal heat. It may naturally be supposed, and indeed it has always been found, that balloons, in passing through the higher regions of the atmosphere, acquire a very considerable quantity of moisture, not only from the rain or snow they sometimes meet with, but even from the dew and vapour which condenses upon them. On this an evaporation will instantly take place; and, as it is the property of this operation to produce a very violent cold, the internal heat of the balloon must be soon exhausted in such a manner as to make it become specifically heavier than the common atmosphere, and consequently descend in a much shorter time than it would have done by the mere loss of air. To this, in all probability, we are to ascribe the descent of the balloon which carried Messrs Blanchard and Jeffries; and

which seemed so extraordinary to many people, that they were obliged to have recourse to an imaginary attraction in the waters of the ocean, in order to solve the phenomenon. This supposition is rejected by Mr Cavallo; who explains the matter, by remarking, in two former voyages made with the same machine, it could not long support two men in the atmosphere; so that we had no occasion to wonder at its weakness on this occasion. "As for its rising higher (says he), just when it got over the land, that may be easily accounted for. In the first place, the two travellers threw out their clothes just about that time; secondly, in consequence of the wind's then increasing, the balloon travelled at a much greater rate than it had done whilst over the sea; which increase of velocity lessened its tendency to descend: besides which, the vicissitudes of heat and cold may produce a very considerable effect; for if we suppose, that the air over the land was colder than that over the sea, the balloon coming into the latter from the former, continued to be hotter than the circumambient air for some time after; and consequently, it was comparatively much lighter when in the cold air over the land, than when in the hotter air over the sea; hence it floated easier in the former than in the latter case."

It seems indeed very probable, that there was something uncommon in the case of Mr Blanchard's balloon while passing over the sea; for, as it rose higher after reaching the land than in any former period of the voyage, and likewise carried them to a distance over land more than half of that which they had passed over water, we can scarce avoid supposing, that it had a tendency to descend when over the water more than when over land, independent of any loss of air. Now, it does not appear that the air over the sea is at all warmer than that above land; on the contrary, there is every reason to believe, that the superior reflective power of the land renders the atmosphere above it warmer than the sea can do: but it is very natural to suppose, that the air above the sea is more moist than that above land; and consequently, by letting fall its moisture upon the balloon, must have occasioned an evaporation that would deprive the machine of its internal heat, which it would partly recover after it entered the warmer and drier atmosphere over land.

We shall now proceed to the construction of aerostatic machines; of which the smaller are only for amusement, or some slight experiments, and are very easily made. As in all of them, however, it is of the utmost consequence to have the weight as little as possible, the shape becomes an object of great consideration. For this purpose a spherical figure has been thematically demonstrated to be the best; as capable of containing a greater quantity under a smaller surface than any other. Thus a perfect sphere contains less surface in proportion to its solidity than a spheroid; a spheroid less than a cylinder; the latter less than a cube; and a cube still less than a parallelopiped. In all cases, therefore, where we can fill the whole capacity of the balloon with air equally light, the spherical figure is undoubtedly to be preferred: and this holds good with regard to all inflammable air balloons, whether their size be great or small; but in the rarefied air ones, where the under part must necessarily be much colder than the upper, the globular shape seems not so proper.

proper. An inverted cone, or truncated pyramid, with the smaller part undermost, seems then to be most proper, as it allows the heated air (which has a great tendency to expand as well as to ascend) to collect in the wide part at the top, while the useless surface, in the lower part, and which, in any other figure, would contain only the colder and heavier air, is thus thrown aside. In fact it has been found, that aerostatic machines, raised by means of rarefied air, when made of the shape of a parallelopiped, or even one deviating still more from the shape of a globe, have answered the purpose as well as they could have been supposed to do, had ever so much care been taken in forming them exactly to that shape. The very first machine made by Mr Montgolfier was in form of a parallelopiped; and though it contained only 40 cubic feet, showed a very considerable power of ascent. A very large one, 74 feet high, which Mr Montgolfier had designed to exhibit before the royal family, had the middle part of it prismatic for about the height of 25 feet; its top was a pyramid of 29 feet; and its lower part was a truncated cone of near 20 feet. It weighed 1000 pounds; and, notwithstanding its shape, in a very short time manifested a power of ascent equal to 500 pounds. Another aerostatic machine of a small size, but of the figure of a parallelopiped, being suffered to ascend with 30 sheets of oiled paper fixed in a wire frame, and set on fire, rose to a great height, and in 22 minutes could not be seen. It seems therefore, that, with regard to the shape of these machines, it is by no means necessary to adhere rigidly to that of a sphere; but that any oblong form answers very well.

Materials.

For experimental purposes, both the inflammable and rarefied air balloons may be made of paper; the former being made of that kind called *thin post*, varnished over with linseed oil; the latter either of that or any other kind, without varnish. In order to avoid the danger of burning, however, it has been proposed to impregnate the paper of which these small rarefied air balloons are made with a solution of sal ammoniac, alum, or some other salt; but this does not seem to be necessary. Those filled with inflammable air have been made of gold-beaters skin or peeled bladders; but the cheaper material of paper is undoubtedly preferable.

Best varnish for inflammable air balloons.

For aerostatic machines of a larger size; the material universally employed is varnished silk; and for those of the rarefied air kind, linen painted over with some size colour, or lined with paper. The best varnish for an inflammable air balloon is that made with birdlime, and recommended by Mr Faujas de Saint Fond, in a treatise published on the subject. The following is his method of preparing it: "Take one pound of bird lime, put it into a new proper earthen pot that can resist the fire, and let it boil gently for about one hour, viz. till it ceases to crackle; or, which is the same thing, till it is so far boiled, as that a drop of it being let fall upon the fire will burn: then pour upon it a pound of spirit of turpentine, stirring it at the same time with a wooden spatula, and keeping the pot at a good distance from the flame, lest the vapour of this essential oil should take fire. After this, let it boil for about six minutes longer; then pour upon the whole three pounds of boiling oil of nuts, linseed, or poppy, rendered drying by means of litharge; stir it well, let

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it boil for a quarter of an hour longer, and the varnish is made. After it has rested for 24 hours, and the sediment has gone to the bottom, decant it into another pot; and when you want to use it, warm, and apply it with a flat brush upon the silk stuff, whilst that is kept well stretched. One coat of it may be sufficient; but if two are necessary, it will be proper to give one on each side of the silk, and to let them dry in the open air while the silk remains extended."

Mr Cavallo gives the following method of preparing this varnish, which he prefers to that of M. de St lo's method.—"In order to render linseed oil drying, boil it with two ounces of saccharum saturni and three ounces of litharge, for every pint of oil, till the oil has dissolved them, which will be accomplished in half an hour; then put a pound of birdlime and half a pint of the drying oil into a pot (iron or copper pots are the safest for this purpose), the capacity of which may be equal to about one gallon, and let it boil very gently over a slow charcoal fire till the birdlime ceases to crackle, which will be in about half or three quarters of an hour; then pour upon it two pints and a half more of drying oil, and let it boil for one hour longer, stirring it very frequently with an iron or wooden spatula. As the varnish, whilst boiling, and especially when it is nearly done, swells very much, care should be had to remove, in those cases, the pot from the fire, and to replace it when the varnish subsides, otherwise it will boil over. Whilst the stuff is boiling, the operator should, from time to time, examine whether the varnish has boiled enough; which is thus known:—Take some of it upon the blade of a knife, and then, after rubbing the blade of another knife upon it, separate the knives; and when, on this separation, the varnish begins to form threads between the two, you may conclude that it is done; and, without losing time, it must be removed from the fire. When it is almost, though not quite, cold, add about an equal quantity of spirit of turpentine: mix it well together, and let it rest till the next day; when, having warmed it a little, strain and bottle it. If it is too thick, add some more spirit of turpentine. When this varnish is laid upon the silk, the stuff should be made perfectly dry, and stretched; so that the varnish, which ought to be used lukewarm, may fill up the pores of the stuff. The varnish should be laid once very thin upon one side of the stuff; and, about 12 hours after, two other coats of it should be laid on, one on each side; and, 24 hours after, the silk may be used, though, in cold weather, it may be left to dry some time longer."

Much has been said in France of their elastic gum varnish, and its composition kept a secret; but Mr Baldwin, after many expensive trials, declares to the world what he considers as the secret; and it is merely this: "Take any quantity of caoutchouc, as two ounces avoirdupois; cut it into small bits with a pair of scissars; put a strong iron ladle (like that used by plumbers) over a common pitcoal or other fire. The fire must be gentle, glowing, and without smoke. When the ladle is hot, much below a red heat, put a single bit into the ladle. If black smoke issues, it will presently flame and disappear, or it will evaporate without flame: the ladle is then too hot. When the ladle is less hot, put in a second bit, which will produce

duce a *white* smoke. This *white* smoke will continue during the operation, and evaporate the caoutchouc: therefore no time is to be lost; but little bits are to be put in, a few at a time, till the whole are melted. It should be continually and gently stirred with an iron or brass spoon. Two pounds or one quart of the best drying oil (or of raw linseed oil, which, together with a few drops of neats-foot oil, has stood a month, or not so long, on a lump of quicklime, to make it more or less drying), is to be put into the melted caoutchouc, and stirred till hot, and the whole poured into a glazed vessel through a coarse gauze or fine sieve. When settled and clear, which will be in a few minutes, it will be fit for use either hot or cold." Mr Baldwin is not at liberty, he observes, to publish the art of laying on the varnish: but says, that it consists in making no *inteline motion* in the varnish, which would create minute bubbles; that therefore brushes are improper. Mr Blanchard's method of making elastic gum varnish for the silk of a balloon, is the following. "Dissolve elastic gum (caoutchouc) cut small in five times its weight of spirit of turpentine, by keeping them some days together; then boil one ounce of this solution in eight ounces of drying linseed oil for a few minutes; lastly, strain it. It must be used warm." The pieces of silk for the balloon must be cut out of a proper size, according to the dimensions, after the varnish is sufficiently dry. They may be joined by laying about half an inch of the edge of one piece over the edge of the other, and sewing them by a double stitching. Mr Blanchard uses expeditiously the following method: He lays about half an inch of the edge of one piece flat over the edge of the other, and passes a hot iron over it; in doing which a piece of paper ought to be laid both under and over the silk. The joining may be rendered more secure by running it with a silk thread, and sticking a ribband over it. The ribbands laid over seams may be stuck with common glue, provided the varnish of the silk is properly dried. When the glue is quite dry, the ribbands should be varnished over, to prevent their being unglued by the rain.

Of cutting
the gores
for a globe.

The best method of cutting the pieces of silk that are to form a balloon, is to describe a pattern of wood or stiff card-paper, and then to cut the silk upon it. As the edges of such a pattern are not perfect circles, they cannot be described by a pair of compasses: but the best method of drawing them is as follows. First, Draw on a flat surface two right lines *AE* and *BC*, fig. 2. perpendicular to each other. Secondly, Find the circumference answering to the given diameter of the balloon in feet and decimals of a foot; and make *AD* and *DE* each equal to a quarter of the circumference, so that the whole length *AE* of the pattern may be equal to half the circumference. Thirdly, Divide *AD* into 18 equal parts; and to the points of division apply the lines *fg*, *hi*, *kl*, &c. parallel to each other, and perpendicular to *AD*. Fourthly, Divide the whole circumference in twice the given number of pieces, and make *DC* and *BB* each equal to the quotient of this division: so that the whole, *BC*, is equal to the greatest breadth of one of these pieces. Fifthly, Multiply the above-mentioned quotient by the decimals annexed to *fg*, viz. 0.99619, and then the product expresses the length of *fg*; again, multiply the same length of *DE* by the decimals annexed to *hi*, and the product ex-

presses the length of *hi*; and, in short, the product arising from the multiplication of the length of *DC* by the decimals annexed to each of the parallel lines, gives the length of that line. Lastly, Having found the lengths of all these lines, draw by hand a curve line passing through all the extremities of the said lines, and that is the edge of one quarter of the pattern. The other quarters may be easily described, by applying to them a piece of paper cut according to that already found. Suppose, for example, that the diameter of the balloon to be constructed is 20 feet, and that it is required to make it of 12 pieces: then, in order to draw the pattern for those pieces, find the circumference of the balloon, which is 62.85 feet, and dividing it by four, the quotient is 15.7 feet; make therefore *AD* equal to 15.7 feet, and *DE* likewise of the same length. Divide the circumference 62.83 by 24, which is double the number of pieces that are to form the balloon, and the quotient, 2.618 feet, is the length of *DC* and likewise of *BD*; so that *BC* is equal to 5.236 feet. Then, having divided the line *AD* into 18 equal parts, and having drawn the parallel lines from those points of division, find the length of each of those lines by multiplying 2.618 by the decimals annexed to that line. Thus, 2.618 multiplied by 0.99619, gives 2.608 feet for the length of *fg*; and again, multiplying 2.618 by 0.98481, gives 2.578 feet for the length of *hi*; and so of the rest. In cutting the pieces after such a pattern, care should be taken to leave them about three quarters of an inch all round larger than the pattern, which will be taken up by the seams.

To the upper part of the balloon there should be adapted, and well fitted in, a valve, opening inwards; to which should be fastened a string passing through a hole made in a small piece of round wood fixed in the lowest part of the balloon opposite to the valve, and the end of this string fastened in the car below, so that the aeronaut may open the valve when occasion requires. The action of this valve may be understood from fig. 3. A round brass plate *AB* has a round hole *CD*, about two or three inches diameter, covered on both sides with strong smooth leather. On the inside there is a shutter *E*, also of brass, covered with leather, which is to close the hole *CD*; being about two inches larger in diameter than the hole. It is fastened to the leather of the plate *AB*; and by a spring, which need not be very strong, it is kept against the hole. The elasticity of the gas itself will help to keep it shut. To this shutter the string is fastened; by which it is occasionally opened for the escape of gas. A small string or other security should be fixed to the shutter and the plate, so as not to admit the shutter to be opened beyond a certain safe distance. To the lower part of the balloon two pipes should be fixed, made of the same stuff as the envelope; 6 inches diameter for a balloon of 30 feet, and proportionably larger for balloons of a greater capacity. They must be long enough for the car. For balloons of 18 feet and less diameter, one neck or pipe will be sufficient. These pipes are the apertures through which the inflammable gas is introduced into the balloon.

The car or boat is best made of wicker-work, covered with leather, and well painted or varnished over; and the proper method of suspending it, is by ropes proceeding

ceeding from the net which goes over the balloon. This net should be formed to the shape of the balloon, and fall down to the middle of it, with various cords proceeding from it to the circumference of a circle about two feet below the balloon; and from that circle other ropes should go to the edge of the boat. This circle may be made of wood, or of several pieces of slender cane bound together. The meshes of the net may be small at top, against which part of the balloon the inflammable air exerts the greatest force; and increase in size as they recede from the top. A hoop has sometimes been applied round the middle of the balloon to fasten the net. This, though not absolutely necessary, is best made of pieces of cane bound together, and covered with leather.

With regard to the rarefied-air machines, Mr Cavallo recommends first to soak the cloth in a solution of sal ammoniac and common size, using one pound of each to every gallon of water; and when the cloth is quite dry, to paint it over in the inside with some earthy colour, and strong size or glue. When this paint has dried perfectly, it will then be proper to varnish it with oily varnish, which might dry before it could penetrate quite through the cloth. Simply drying linseed oil will answer the purpose as well as any, provided it be not very fluid.

Of filling
aerostatic
machines.

It now only remains to give some account of the method by which aerostatic machines may be filled with their proper gas, in order to give them their power of ascending into the atmosphere; and here we are enabled to determine with much greater precision concerning the inflammable air balloons than the others.

Methods of
procuring
inflammable
air.

With regard to them, a primary consideration is, the most proper method of procuring the inflammable air. It may be obtained in various ways, as will be shown under the article CHEMISTRY. But the most advantageous methods are, by applying acids to certain metals; by exposing animal, vegetable, and some mineral substances, in a close vessel to a strong fire; or by transmitting the vapour of certain fluids through red-hot tubes.

1. In the first of these methods, iron, zinc, and sulphuric acid are the materials most generally used. The sulphuric acid must be diluted with five or six parts of water. Iron may be expected to yield in the common way 1700 times its own bulk of gas; or one cubic foot of inflammable air to be produced by $4\frac{1}{2}$ ounces of iron, the like weight of sulphuric acid, and $22\frac{1}{2}$ ounces of water. Six ounces of zinc, an equal weight of sulphuric acid, and 30 ounces of water, are necessary for producing the same quantity of gas. It is more proper to use the turnings or chippings of great pieces of iron, as of cannon, &c. than the filings of that metal, because the heat attending the effervescence will be diminished; and the diluted acid will pass more readily through the interstices of the turnings when they are heaped together, than through the filings, which stick closer to one another. The weight of the inflammable air thus obtained by means of sulphuric acid, is, in the common way of procuring it, generally one-seventh part of the weight of common air; but with the necessary precautions for philosophical experiments, less than one-tenth of the weight of common air. Two other sorts of elastic fluids are sometimes generated with the inflammable air. These

may be separated from it by passing the inflammable air through water in which quicklime has been dissolved. The water will absorb these fluids, cool the inflammable air, and prevent its over-heating the balloon when introduced into it.

Fig. 4. of Plate II. represents an apparatus described by Mr Cavallo as proper for filling balloons of the size of two or three feet in diameter with inflammable air, after passing it through water.—A is the bottle with the ingredients; BCD a tube fastened in the neck at B, and passing through C, the cork of the other bottle, in which there is another hole made to receive the tube on which the balloon is tied. Thus it is plain, that the inflammable air coming out of the tube D will pass first through the water of the bottle E and then into the balloon. Two small casks may be used instead of the bottles A and E.

2. Inflammable air may be obtained at a much cheaper rate by the action of fire on various substances; but the gas which these yield is not so light as that produced by the effervescence of acids and metals. The substances proper to be used in this way are, pitcoal, asphaltum, amber, rock-oil, and other minerals; wood and especially oak, camphor-oil, spirits of wine, ether, and animal substances, which yield air in different degrees, and of various specific gravities; but pitcoal is the preferable substance. A pound of this exposed to a red heat, yields about three cubic feet of inflammable air, which, whether it be passed through water or not, weighs about one-fourth of the weight of common air. Dr Priestley found, as we have elsewhere noticed, that animal or vegetable substances will yield six or seven times more inflammable air when the fire is suddenly increased than when it is gently raised, though it be afterwards made very strong. Mr Cavallo observes, that the various substances above enumerated generally yield all their inflammable air in about one hour's time. The general method is, to enclose the substances in iron or earthen vessels, and thus expose them to a strong fire sufficient to make the vessels red hot: the inflammable air proceeding from the aperture of the vessel is received into a tube or refrigerator, and, passing through the tube or worm, is at last collected in a balloon or other vessel. A gun-barrel has often been used for essays of this kind. The substance is put into it so as to fill six or eight inches of its lowest part, the remainder filled with dry sand: a tube, adapted to the mouth of the barrel, is brought into a basin of water under an inverted receiver; and the part of the barrel containing the substance being put into the fire and made red-hot, the inflammable air is collected in the inverted receiver. As the gun-barrel cannot serve for producing a large quantity of inflammable air, Mr Cavallo recommends, as the most advantageous shape, the following contrivance: Let the vessel be made of clay, or rather of iron, in the shape of a Florence flask, somewhat larger, and whose neck is longer and larger (See ABC, fig. 5.) Put the substance to be used into this vessel, so as to fill about four-fifths or less of its cavity AB. If the substance is of such a nature as to swell much by the action of the fire, lute a tube of brass, or first a brass and then a leaden tube, to the neck C of the vessel; and let the end D of the tube be shaped as in the figure, so that going into the water of a tube HI, it may terminate under a sort of inverted ves-

fel EF, to the upper aperture of which the balloon G is adapted. Things thus prepared, if the part AB of the vessel is put into the fire, and made red hot, the inflammable air produced will come out of the tube CD, and passing through the water will at last enter into the balloon G. Previous to the operation, as a considerable quantity of common air remains in the inverted vessel EF, which it is more proper to expel, the vessel EF should have a stop-cock K, through which the common air may be sucked out, and the water ascend as high as the stop-cock. The dimensions of such an apparatus Mr Cavallo gives thus: Diameter of largest part of the vessel ABC seven inches, length of whole vessel 16 inches; diameter of its aperture one inch, diameter of the cavity of the tube CD three-fourths of an inch; lower aperture of the vessel EF six inches, least height of the vessel EF 24 inches; its aperture F about two inches. The aperture of the vessel EF should be at least one foot below the surface of the water in HI. Care must be taken that the fire used in this process be at a sufficient distance, otherwise it may happen to fire the inflammable air which may escape out of the vessel EF.

3. The last method of obtaining inflammable air was discovered by Mr Lavoisier, and also by Dr Priestley. Mr Lavoisier made the steam of boiling water pass through the barrel of a gun, kept red hot by burning coals. Dr Priestley uses, instead of the gun-barrel, a tube of red hot brass, upon which the steam of water has no effect, and which he fills with the pieces of iron which are separated in the boring of cannon. By this method he obtains an inflammable air, the specific gravity of which is to that of common air as 1 to 13. In this method, not yet indeed reduced to general practice, a tube about three quarters of an inch in diameter, and about three feet long, is filled with iron turnings; then the neck of a retort, or close boiler, is luted to one of its ends, and the worm of a refrigeratory is adapted to its other extremity. The middle part of the tube is then surrounded with burning coals, so as to keep about one foot in length of it red hot, and a fire is always made under the retort or boiler sufficient to make the water boil with vehemence. In this process a considerable quantity of inflammable air comes out of the worm of the refrigeratory. It is said that iron yields one-half more air by this means than by the action of sulphuric acid.

For filling large balloons, a greater apparatus is necessary; and the only materials that can, with any certainty of success, be employed for producing the proper gas, are, sulphuric acid, and iron filings or turnings.

It has indeed been recommended to use zinc instead of iron filings, because white vitriol, the salt produced by the union of the sulphuric acid and zinc, is much more valuable than the green fort produced by the union of the same acid with iron. But though this is undoubtedly the case, it will as certainly be found, upon trial, that the superior price of the zinc will be more than an equivalent for all the advantage that can be derived from the additional price of the white vitriol. For a balloon of 30 feet diameter, Mr Cavallo recommends 3900 pounds of iron turnings, as much sulphuric acid, and 19,500 pounds of water. These proportions, however, appear too great with respect to the acid and metal, and too little with respect to the

water. Sulphuric acid will not exert its power upon iron unless it be diluted with five or six times its quantity of water; in which case, a much smaller quantity of both acid and metal will serve. Mr Lunardi, who from the number of his voyages had certainly much practical knowledge in aerostation, filled his balloon at Edinburgh and Glasgow with about 2000 pounds of iron (the borings of cannon procured from Carron), as much sulphuric acid, and 12,000 pounds of water. The iron was placed in his vessels in layers, with straw between them, in order to increase the surface. His apparatus was not materially different from that of Mr Cavallo, fig. 6. where AA are two tubes, about three feet in diameter and nearly two feet deep, inverted in large tubs BB filled with water. In the bottom of each of the inverted tubs a hole is made, and a tube E of tin adapted, which is about seven inches in diameter, and seven or eight long. To these tubes the silken ones of the balloon are to be tied. Round each of the tubes B, five, six, or more strong casks are placed; in the top of each two holes are made, and to one of these holes a tin tube is adapted, and so shaped, that, passing over the edge of the tub B, and through the water, it may terminate with its aperture under the inverted tube A. The other hole of these casks serves for the introduction of materials, and is stopped with a wooden plug. When the balloon is to be filled, put the net over it, and let it be suspended as shown by CDF; and having expelled all the common air from it, let the silken tube be fastened round the tin ones EE; and the materials being put into the casks, the inflammable air, passing into the balloon, will soon distend, and render it capable of supporting itself; after which the rope GH may be slipped off. As the balloon continues to be filled, the net is adjusted properly round it; the cords that surround it are fastened to the hoop MN; then the boat IK being placed between the two sets of casks, is fastened to the hoop MN, and every thing that is required to be sent up, as ballast, instruments, &c. is placed in it. At last, when the balloon is little more than three quarters full, the silken tubes are separated from the tin ones of the inverted tubs, and their extremities being tied up, are placed in the boat. Lastly, The aeronauts being seated in the boat, the lateral ropes are slipped off, and the machine is abandoned to the air. (See *Blanchard's Balloon*, Plate III.) This apparatus was at last reduced by Mr Lunardi to its utmost simplicity, by using only two large casks, and suffering the vapour to go into the balloon without passing through water. Thus his balloon was filled in less than half an hour, when before, it had required two hours at least. The sinking of his casks in the ground was also an additional convenience, as it created no confusion, and rendered the materials much more easily conveyed into them.

With regard to the rarefied air balloons, the method of filling them is as follows. A scaffold ABCD, fig. 7. of filling the breadth of which is at least two-thirds of the diameter of the machine, is elevated about six or eight feet above the ground. From the middle of it descends a well E, rising about two or three feet above it, and reaching to the ground, furnished with a door or two, through which the fire in the well is supplied with fuel. The well should be constructed of brick or of plastered wood,

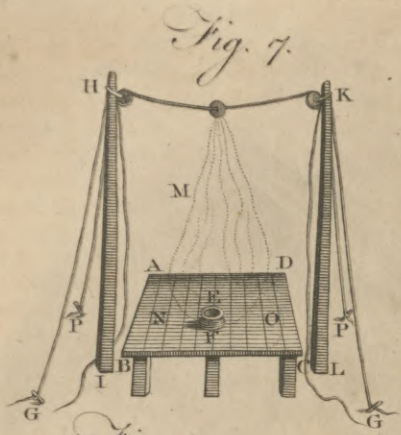


Fig. 11.

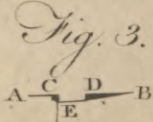
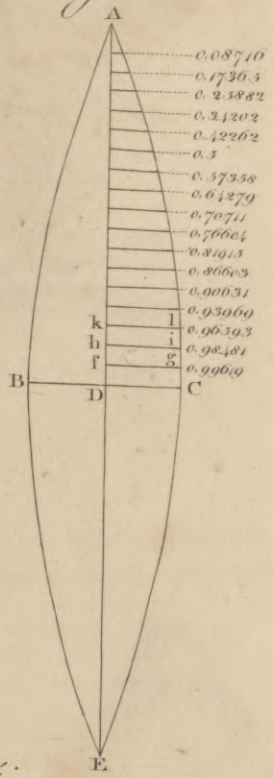


Fig. 1.

Fig. 2.



View from a Balloon above the clouds, seen by Mr. Baldwin.



Fig. 10.



Fig. 5.



Fig. 8.

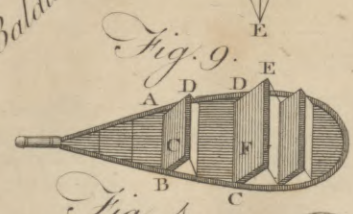


Fig. 9.



Fig. 4.

ALBERTUS MAGNUS

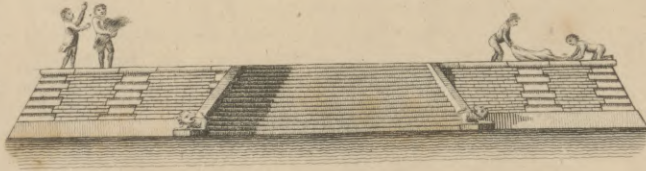
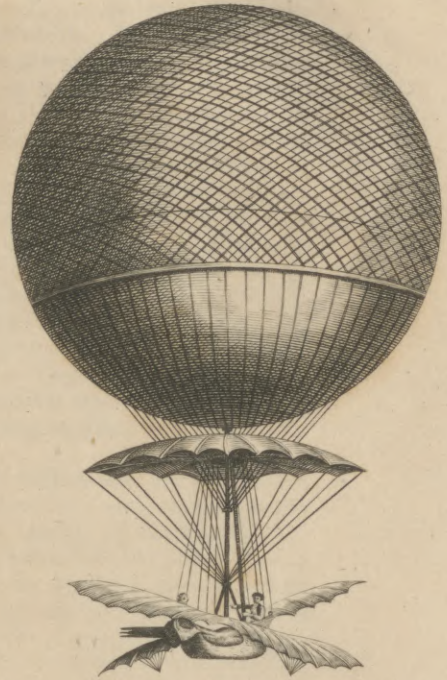


AEROSTATION.

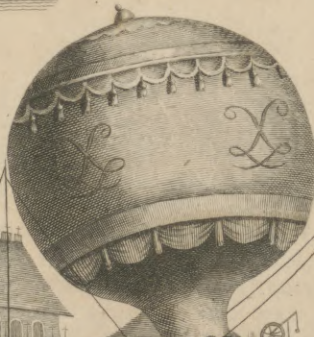
Montgolfier's Balloon.
Fauxbourg St. Antoine



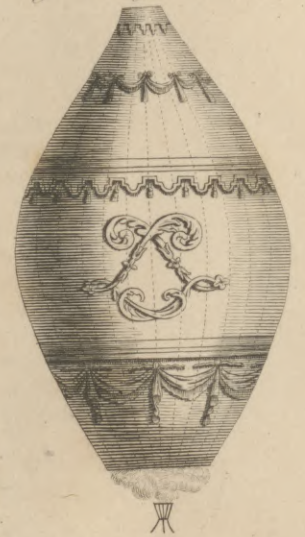
Blanchard's Balloon.



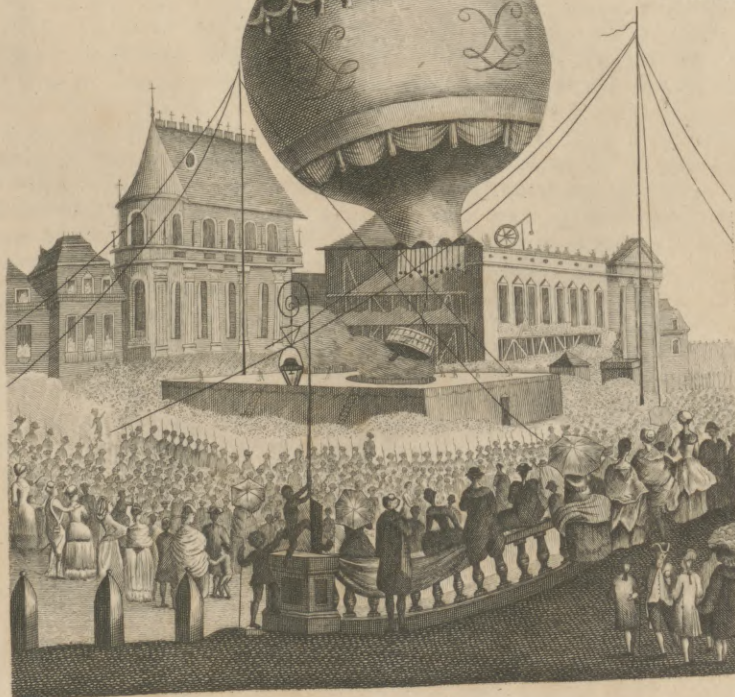
Verfailles
B.



Montgolfier's B.
Fauxbourg of St. Germain.



Charles. & Roberts. B.
Camp de Mars.



wood, and its diameter should be somewhat less than that of the machine. On each side of the scaffold are erected two masts HI, KL, each of which has a pulley at the top, and rendered firm by means of ropes KG, KP, HP, HG. The machine to be filled is to be placed on the scaffold, with its neck round the aperture of the well. The rope passing over the pulleys of the two masts, serves, by pulling its two ends, to lift the balloon about 15 feet or more above the scaffold; and the rest of the machine is represented by the dotted lines in the figure MNO. The machine is kept steady, and held down, whilst filling, by ropes passing through loops or holes about its equator; and these ropes may easily be disengaged from the machine, by slipping them through the loops when it is able to sustain itself. The proper combustibles to be lighted in the well, are those which burn quick and clear, rather than such as produce much smoke; because it is hot air, and not smoke, that is required to be introduced into the machine. Small wood and straw have been found to be very fit for this purpose. Mr Cavallo observes, as the result of many experiments with small machines, that spirit of wine is upon the whole the best combustible; but its price may prevent its being used for large machines. As the current of hot air ascends, the machine will soon dilate, and lift itself above the scaffold and gallery which was covered by it. The passengers, fuel, instruments, &c. are then placed in the gallery. When the machine makes efforts to ascend, its aperture must be brought, by means of the ropes annexed to it, towards the side of the well a little above the scaffold; the fire-place is then suspended in it, the fire lighted in the grate, and the lateral ropes being slipped off, the machine is abandoned to the air. (See *Montgolfier's balloon*, Plate III.) It has been determined by accurate experiments, that only one-third of the common air can be expelled from these large machines: and therefore the ascending power of the rarefied air in them can be estimated as only equal to half an ounce avoirdupois for every cubic foot.

The conduct of balloons, when constructed, filled, and actually ascending in the atmosphere, is an object of great importance in the practice of aërostation. The method generally used for elevating or lowering the balloons with rarefied air, has been the increase or diminution of the fire: and this is entirely at the command of the aeronaut, as long as he has any fuel in the gallery. The inflammable air balloons have been generally raised or lowered by diminishing the weight in the boat, or by letting out some of the gas through the valve: but the alternate escape of the air in descending, and discharge of the ballast for ascending, will by degrees render the machine incapable of floating; for in the air it is impossible to supply the loss of ballast, and very difficult to supply that of inflammable air. These balloons will also rise or fall by means of the rarefaction or condensation of the enclosed air, occasioned by heat and cold. It has been proposed to aid a balloon in its alternate motion of ascent and de-

scend, by annexing to it a vessel of common air, which might be condensed for lowering the machine, and rarefied again, by expelling part of it, for raising the machine: But a vessel adapted to this purpose must be very strong; and, after all, the assistance afforded by it would not be very considerable. M. Meunier, in order to attain this end, proposes to enclose one balloon filled with common air in another filled with inflammable air: as the balloon ascends, the inflammable air is dilated, and of course compresses the internal balloon containing the common air: and by diminishing its quantity, lessens its weight. If it should be necessary to supply this loss, he says it may be easily done by a pair of bellows fixed in the gallery. Others have proposed to annex a small machine with rarefied air to an inflammable-air balloon by ropes, at such a distance that the fire of the former might not affect the inflammable air of the latter: the whole apparatus, thus combined, of balloons formed on the two principles of heated and inflammable air, might be raised or lowered by merely increasing or diminishing the fire in the lower balloon.

Wings or oars are the only means of this sort that have been used with some success: and, as Mr Cavallo observes, they seem to be capable of considerable improvement. Although great effects are not to be expected from them, when the machine goes at a great rate, the best methods of moving those wings are by the human strength applied similarly to the oars of a waterman. They may be made in general of silk stretched between wires, tubes, or sticks; and when used, must be turned edgewise when they are moved in the direction in which the machine is intended to be impelled, but flat in the opposite direction. Fig. 8. is the representation of one of Mr Blanchard's wings. Fig. 9. is one of those used by Mr Lunardi, which consists of many silk shutters or valves, ABCD, DECF, &c. every one of which opens on one side only, *viz.* AD, BC opens upon the line AB, DECF opens upon the line DC, &c. In consequence of this construction, this sort of oars does not need being turned edgewise. Fig. 10. represents one of the wings used by the brothers Roberts in the aerial voyage of the 19th September 1784; and fig. 11. represents one of the wings constructed by Count Zambeccari, which consists of a piece of silk stretched between two tin tubes set at an angle; but these wings are so contrived as to turn edgewise by themselves when they go on one direction. Other contrivances have been made to direct aërostatic machines, but they have mostly been invented to effect a power upon them as upon a ship. It appears, however, that they can have no effect when a machine is only moved by the wind alone, because the circumambient air is at rest in respect to the machine. The case is quite different with a vessel at sea, because the water on which it floats stands still whilst the vessel goes on; but it must be time and experience that can realize the expectations suggested by these contrivances.

Aerschot

Æschines.

AERSCHOT, a town of the Austrian Netherlands, in the duchy of Brabant, and capital of the duchy of Aerschot. It is seated on the river Demur, ten miles east of Malines or Mechlin, and eight north of Louvain. E. Long. 5. 44. N. Lat. 51.

ÆRUGINOUS, an epithet given to such things as resemble or partake of the nature of the rust of copper.

ÆRUGO, in *Natural History*, properly signifies the rust of copper, whether natural or artificial. The former is found about copper mines, and the latter, called *verdigris*, made by corroding copper plates with acids.

ÆRUSCATORES, in *Antiquity*, a kind of strolling beggars, not unlike gypsies, who drew money from the credulous by fortune-telling. &c. It was also a denomination given to gripping exactors, or collectors of the revenue. The Galli, or priests of Cybele, were called *ærufcatores magnæ matris*; and *ματρωγυγῆαι*, on account of their begging or collecting alms in the streets; to which end they had little bells to draw people's attention, similar to some orders of mendicants abroad.

AERY, or **ATRY**, among sportsmen. See **ATRY**.

ÆS UXORIUM, in *Antiquity*, a sum paid by bachelors, as a penalty for living single to old age. This tax for not marrying seems to have been first imposed in the year of Rome 350, under the censorship of M. Furius Camillus and M. Posthumus. At the census, or review of the people, each person was asked, *Et tu ex anima sententia uxorem habes liberum querendorum causâ?* He who had no wife was herupon fined after a certain rate, called *æs uxorium*.

Æs per et libram was a formula in the Roman law, whereby purchases and sales were ratified. Originally the phrase seems to have been only used in speaking of things sold by weight, or by the scales; but it afterwards was used on other occasions. Hence even in adoptions, as there was a kind of imaginary purchase, the formula thereof expressed, that the person adopted was bought *per æs et libram*.

Æs Flavum, yellow copper, among the Romans, an appellation given to the coarser kinds of brass.

The ancients had different kinds of brass, as *æs candidum*, *æs Corinthium*, denoting probably different metallic alloys or mixtures.

Æs Caldarium, a term used by the German mineralists, for a substance which sometimes occurs to those who work upon cobalt, and is used for making the fine blue colour called *smalt*.

Æs Ustum, a chemical preparation, made of thin leaves of copper, sulphur, and nitre, placed *stratum super stratum* in a crucible, and set in a charcoal fire till all the sulphur is consumed; after which, the copper is taken out of the crucible, and reduced to powder. Some quench the leaves of copper in vinegar, and repeat the calcination.—Its principal use is in colouring glass, to which it gives a beautiful tincture. The surgeons use it as a detesive, and some have given it internally; but it is certainly a very dangerous medicine, and should be avoided.

ÆSCHINES, an Athenian, a Socratic philosopher, a son of Charinus a sausage-maker. He was continually with Socrates; which occasioned this philosopher to say, that the sausage-maker's son was the only

person who knew how to pay a due regard to him. Æschines.

It is said that poverty obliged him to go to Sicily to Dionysius the Tyrant; and that he met with great contempt from Plato, but was extremely well received by Aristippus; to whom he showed some of his dialogues, and received from him a handsome reward. He would not venture to profess philosophy at Athens, Plato and Aristippus being in such high esteem; but he opened a school in which he taught philosophy to maintain himself. He afterwards wrote orations for the Forum. Phrynicius, in Photius, ranks him amongst the best orators, and mentions his orations as the standard of the pure Attic style. Hermogenes has also spoken very highly of him. He wrote besides several Dialogues, of which there are only three extant: 1. Concerning virtue, whether it can be taught. 2. Eryxias, or Erasistratus; concerning riches, whether they are good. 3. Axiochus; concerning death, whether it is to be feared. Mr. Le Clerc has given a Latin translation of them, with notes and several dissertations, entitled *Sylvæ Philologicae*.

ÆSCHINES, a celebrated Grecian orator, was born at Athens 327 years before the Christian era. According to his own account, he was of distinguished birth; according to that of Demosthenes, he was the son of a courtesan, and a humble performer in a company of comedians. But whatever was the true history of his birth and early life, his talents, which were considerable, procured him great applause, and enabled him to be a formidable rival to Demosthenes himself. The two orators, inspired probably with mutual jealousy and animosity, became at last the strenuous leaders of opposing parties. Æschines was accused by Demosthenes of having received money as a bribe when he was employed on an embassy to Philip of Macedon. He indirectly retaliated this charge by bringing an accusation against Ctesiphon the friend of Demosthenes for having moved a decree, contrary to the laws, to confer on Demosthenes a golden crown, as a mark of public approbation. A numerous assembly of judges and citizens met to hear and decide the question: each orator employed all his powers of eloquence; but Demosthenes, with superior talents, and with justice on his side, was victorious; and Æschines was sent into exile. The resentment of Demosthenes was now softened into generous kindness; for when Æschines was going into banishment, he requested him to accept of a sum of money; which made him exclaim, "How do I regret leaving a country where I have found an enemy so generous, that I must despair of ever meeting with a friend who shall be like him!"

Æschines opened a school of eloquence at Rhodes, which was the place of his exile, and he commenced his lectures by reading to his audience the two orations which had been the cause of his banishment. His own oration received great praise; but that of Demosthenes was heard with boundless applause. In so trying a moment, when vanity must be supposed to have been deeply wounded, with a noble generosity of sentiment, he said, "What would you have thought, if you had heard him thunder out the words himself."—Æschines afterwards removed to Samos, where he died, in the 75th year of his age. Three of his orations only are extant. His eloquence is not without energy,

Æschylus. energy, but it is diffuse and ornamented, and more calculated to please than to move the passions. (*Gen. Biog.*)

ÆSCHYLUS, the tragic poet, was born at Athens. The time of his birth is not exactly ascertained; some suppose that it was in the 65th, others in the 70th Olympiad; but according to Stanley, who follows the Arundelian marbles, he was born in the 63d Olympiad. He was the son of Euphorion, and brother to Cynegirus and Aminias, who distinguished themselves in the battle of Marathon, and the sea-fight of Salamis, at which engagements Æschylus was likewise present. In this last action, according to Diodorus Siculus, Aminias, the younger of the three brothers, commanded a squadron of ships, and fought with so much conduct and bravery, that he sunk the admiral of the Persian fleet, and signalized himself above all the Athenians. To this brother our poet was, upon a particular occasion, obliged for saving his life: Ælian relates, that Æschylus being charged by the Athenians with certain blasphemous expressions in some of his pieces, was accused of impiety, and condemned to be stoned to death: They were just going to put the sentence in execution, when Aminias, with a happy presence of mind, throwing aside his cloak, showed his arm without a hand, which he had lost at the battle of Salamis in defence of his country. This sight made such an impression on the judges, that, touched with the remembrance of his valour, and with the friendship he showed for his brother, they pardoned Æschylus. Our poet, however, resented the indignity of this prosecution, and resolved to leave a place where his life had been in danger. He became more determined in this resolution when he found his pieces less pleasing to the Athenians than those of Sophocles, though a much younger writer. Some affirm, that Æschylus never sat down to compose but when he had drunk liberally. He wrote a great number of tragedies, of which there are but seven remaining: and notwithstanding the sharp censures of some critics, he must be allowed to have been the father of the tragic art. In the time of Thespis, there was no public theatre to act upon; the strollers driving about from place to place in a cart. Æschylus furnished his actors with masks, and dressed them suitably to their characters. He likewise introduced the buskin, to make them appear more like heroes.—The ancients gave Æschylus also the praise of having been the first who removed murders and shocking sights from the eyes of the spectators. He is said likewise to have lessened the number of the chorus. M. Le Fevre has observed, that Æschylus never represented women in love in his tragedies; which, he says, was not suited to his genius; but, in representing a woman transported with fury, he was incomparable. Longinus says, that Æschylus has a noble boldness of expression; and that his imagination is lofty and heroic. It must be owned, however, that he affected pompous words, and that his sense is too often obscured by figures: this gave Salmastius occasion to say, that he was more difficult to be understood than the Scripture itself. But notwithstanding these imperfections, this poet was held in great veneration by the Athenians, who made a public decree that his tragedies should be played after his death. He was killed in the 69th year of his age, by

an eagle letting fall a tortoise upon his head as he was walking in the fields. He had the honour of a pompous funeral from the Sicilians, who buried him near the river Gela; and the tragedians of the country performed plays and theatrical exercises at his tomb.—The best edition of his plays is that of London, 1663, folio, with a Latin translation and a learned commentary by Thomas Stanley.

ÆSCHYNOMENE, BASTARD SENSITIVE PLANT, in *Botany*. See *BOTANY Index*.

ÆSCULAPIUS, in the *Heathen Mythology*, the god of physic, was the son of Apollo and the nymph Coronis. He was educated by the centaur Chiron, who taught him physic; by which means Æsculapius cured the most desperate diseases. But Jupiter, enraged at his restoring to life Hippolitus, who had been torn in pieces by his own horses, killed him with a thunderbolt. According to Cicero, there were three deities of this name: the first, the son of Apollo, worshipped in Arcadia, who invented the probe, and bandages for wounds; the second, the brother of Mercury, killed by lightning; and the third, the son of Arisippus and Arsinoe, who first taught the art of tooth-drawing and purging. At Epidaurus, Æsculapius's statue was of gold and ivory, with a long beard, his head surrounded with rays, holding in one hand a knotty stick, and the other entwined with a serpent; he was seated on a throne of the same materials as his statue, and had a dog lying at his feet. The Romans crowned him with laurel, to represent his descent from Apollo; and the Phalians represented him as beardless. The cock, the raven, and the goat, were sacred to this deity. His chief temples were at Pergamus, Smyrna, Trica a city in Ionia, and the Isle of Coos; in all which votive tablets were hung up, showing the diseases cured by his assistance. But his most famous shrine was at Epidaurus; where, every five years, games were instituted to him, nine days after the Isthmian games at Corinth.

ÆSCULUS, the HORSE-CHESTNUT, in *Botany*. See *BOTANY Index*.

ÆSOP, the Phrygian, lived in the time of Solon, about the 50th Olympiad, under the reign of Croesus the last king of Lydia. As to genius and abilities, he was greatly indebted to nature; but in other respects not so fortunate, being born a slave and extremely deformed. St Jerome, speaking of him, says he was unfortunate in his birth, condition in life, and death; hinting thereby at his deformity, servile state, and tragical end. His great genius, however, enabled him to support his misfortunes; and in order to alleviate the hardships of servitude, he composed those entertaining and instructive fables which have acquired him so much reputation. He is generally supposed to have been the inventor of that kind of writing; but this is contested by several, particularly Quintilian, who seems to think that Hesiod was the first author of fables. Æsop, however, certainly improved this art to a very great degree; and hence it is that he has been accounted the author of this sort of productions:

*Æsopus auctor quam materiam reperit,
Hanc ego polivi versibus senarius.*

PHÆD.

Mine is the task, in easy verse,
The tales of Æsop to rehearse.

The

Æschyno-
mene
||
Æsop.

Æsop. The first master whom *Æsop* served, was one *Caræus Demarchus*, an inhabitant of Athens, and there, in all probability, he acquired his purity in the Greek tongue. After him he had several masters; and at length came under a philosopher named *Idæon* or *Iadmon*, who enfranchised him. After he had recovered his liberty, he soon acquired a great reputation amongst the Greeks; so that, according to *Meziriac*, the report of his wisdom having reached *Cræsus*, he sent to inquire after him, and engaged him in his service. He travelled through Greece, according to the same author; whether for his own pleasure, or upon the affairs of *Cræsus*, is uncertain; and passing by Athens soon after *Pisistratus* had usurped the sovereign power, and finding that the Athenians bore the yoke very impatiently, he told them the fable of the frogs who petitioned Jupiter for a king. The images made use of by *Æsop* are certainly very happy inventions to instruct mankind; they possess all that is necessary to perfect a precept, having a mixture of the useful with the agreeable. "*Æsop* the fabulist (says *Aulus Gellius*) was deservedly esteemed wise, since he did not, after the manner of the philosophers, rigidly and imperiously dictate such things as were proper to be advised and persuaded; but framing entertaining and agreeable apologues, he thereby charms and captivates the human mind."—*Æsop* was put to death at Delphi. *Plutarch* tells us, that he came there with a great quantity of gold and silver, being ordered by *Cræsus* to offer a sacrifice to *Apollo*, and to give a considerable sum to each inhabitant: but a quarrel arising betwixt him and the Delphians, he sent back the money to *Cræsus*; for he thought those for whom the prince designed it, had rendered themselves unworthy of it. The inhabitants of Delphi brought an accusation of sacrilege against him; and pretending they had convicted him, threw him headlong from a rock. For this cruelty and injustice, we are told they were visited with famine and pestilence; and consulting the oracle, they received for answer, that the god designed this as a punishment for their treatment of *Æsop*: they endeavoured to make an atonement, by raising a pyramid to his honour.

ÆSOP, CLODIUS, a celebrated actor, who flourished about the 670th year of Rome. He and *Roscius* were cotemporaries, and the best performers who ever appeared upon the Roman stage; the former excelling in tragedy, the latter in comedy. *Cicero* put himself under their direction to perfect his action. *Æsop* lived in a most expensive manner, and at one entertainment is said to have had a dish which cost above eight hundred pounds; this dish, we are told, was filled with singing and speaking birds, some of which cost near 50l. The delight which *Æsop* took in this sort of birds proceeded, as *Mr Bayle* observes, from the expence. He did not make a dish of them because they could speak, according to the refinement of *Pliny* upon this circumstance, this motive being only by accident; but because of their extraordinary price. If there had been any birds that could not speak, and yet more scarce and dear than these, he would have procured such for his table. *Æsop's* son was no less luxurious than his father, for he dissolved pearls for his guests to swallow. Some speak of this as a common practice of his; but others mention his falling into this excess only on a particular day, when he was treating his friends. Ho-

race * speaks only of one pearl of great value, which he dissolved in vinegar, and drank. *Æsop*, notwithstanding his expences, is said to have died worth above 160,000l. When he was upon the stage, he entered into his part to such a degree, as sometimes to be seized with a perfect ecstasy: *Plutarch* mentions it as reported of him, that whilst he was representing *Atræus* deliberating how he should revenge himself on *Thyestes*, he was so transported beyond himself in the heat of action, that with his truncheon he smote one of the servants crossing the stage, and laid him dead on the spot.

ÆSTIMATIO CAPITIS, a term met with in old law books for a fine anciently ordained to be paid for offences committed against persons of quality, according to their several degrees.

ÆSTIVAL, in a general sense, denotes something connected with, or belonging to, summer. Hence, æstival sign, æstival solstice, &c.

ÆSTUARIA, in *Geography*, denotes an arm of the sea, which runs a good way within land. Such is the *Bristol channel*, and many of the friths of Scotland.

ÆSTUARIES, in ancient baths, were secret passages from the hypocaustum into the chambers.

ÆSTUARY, among *Physicians*, a vapour bath, or any other instrument for conveying heat to the body.

ÆSYMNIUM, in *Antiquity*, a monument erected to the memory of the heroes by *Æsymnus* the Megarean. He consulting the oracle in what manner the Megareans might be most happily governed, was answered, *If they held consultation with the more numerous*: whom he taking for the dead, built the said monument, and a senate-house that took within its compass the monument; imagining, that thus the dead would assist at their consultations. (*Pausanias*.)

ÆETH, or *Ατη*, a strong little town in the Austrian Netherlands and province of *Hainault*, situated on the river *Dender*, about twenty miles south-west of *Brussels*.

ÆETHALIA, or *Ιλυα*, in *Ancient Geography*, now *Elba*; an island on the coast of *Etruria*, in compass an hundred miles, abounding in iron. It was so called from *αιθαλη*, smoke, which issued from the shops of *Vulcan*.

ÆTHELSTAN, see *ATHELSTAN*.

ÆTHER, is usually understood of a thin, subtle matter, or medium, much finer and rarer than air; which commencing from the limits of our atmosphere, possesses the whole heavenly space.—The word is Greek, *αιθηρ*, supposed to be formed from the verb *αιθειν*, "to burn, to flame;" some of the ancients, particularly *Anaxagoras*, supposing it to be of the nature of fire.

The philosophers cannot conceive that the largest part of the creation should be perfectly void; and therefore they fill it with a species of matter under the denomination of *æther*. But they vary extremely as to the nature and character of this *æther*. Some conceive it as a body *sui generis*, appointed only to fill up the vacuities between the heavenly bodies; and therefore confined to the regions above our atmosphere. Others suppose it of so subtle and penetrating a nature, as to pervade the air and other bodies, and possess the pores and intervals thereof. Others deny the existence of any such specific matter; and think the air itself, by that immense tenuity and expansion it is found capable of,

Æstivatio
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Æther.
*Sat. II. lib. ii. 239.

Æther. of, may diffuse itself through the interstellar spaces, and be the only matter found therein.

In effect, æther, being no object of our sense, but the mere work of imagination, brought only upon the stage for the sake of hypothesis, or to solve some phenomenon, real or imaginary; authors take the liberty to modify it how they please. Some suppose it of an elementary nature, like other bodies; and only distinguished by its tenuity, and the other affections consequent thereon: which is the philosophical æther. Others will have it of another species, and not elementary; but rather a sort of fifth element, of a purer, more refined, and spirituous nature, than the substances about our earth; and void of the common affections thereof, as gravity, &c. The heavenly spaces being the supposed region or residence of a more exalted class of beings, the medium must be more exalted in proportion. Such is the ancient and popular idea of æther, or æthereal matter.

The term *æther* being thus embarrassed with a variety of ideas, and arbitrarily applied to so many different things, the later and severer philosophers choose to set it aside, and in lieu thereof substitute other more determinate ones. Thus, the Cartesians use the term *materia subtilis*; which is their æther: and Sir Isaac Newton, sometimes a *subtile spirit*, as in the close of his *Principia*; and sometimes a *subtile* or *æthereal medium*, as in his *Optics*.

Heat, Sir Isaac Newton observes, is communicated through a vacuum almost as readily as through air: but such communication cannot be without some interjacent body, to act as a medium. And such body may be subtile enough to penetrate the pores of glass, and may permeate those of all other bodies, and consequently be diffused through all the parts of space.

The existence of such an æthereal medium being settled, that author proceeds to its properties; inferring it to be not only rarer and more fluid than air, but exceedingly more elastic and active: in virtue of which properties he shows, that a great part of the phenomena of nature may be produced by it. To the weight, *e. g.* of this medium, he attributes gravitation, or the weight of all other bodies; and to its elasticity the elastic force of the air and of nervous fibres, and the emission, refraction, reflection, and other phenomena of light; as also, sensation, muscular motion, &c. In fine, this same matter seems the *primum mobile*, the first source or spring of physical action in the modern system.

The Cartesian æther is supposed not only to pervade, but adequately to fill, all the vacuities of bodies; and thus to make an absolute plenum in the universe.

But Sir Isaac Newton overturns this opinion, from divers considerations; by showing, that the celestial spaces are void of all sensible resistance: and, hence it follows, that the matter contained therein must be immensely rare, in regard the resistance of bodies is chiefly as their density; so that if the heavens were thus adequately filled with a medium or matter, how subtile soever, they would resist the motion of the planets and comets much more than quicksilver or gold. But it has been supposed that what Newton has said of æther is to be considered only as a conjecture, and especially as no new proofs of its existence have been adduced since his time.

The late discoveries in electricity have thrown great

light upon this subject, and rendered it extremely probable that the æther so often talked of is no other than the electric fluid, or solar light, which diffuses itself throughout the whole system of nature.

ÆTHER, in *Chemistry*, a light, volatile, and very inflammable liquid, produced by distillation of acids with rectified spirit of wine. See *CHEMISTRY Index*.

ÆTHEREAL, ÆTHEREUS, something that belongs to, or partakes of, the nature of ÆTHER. Thus we say, the *æthereal space*, *æthereal regions*, &c.

Some of the ancients divided the universe, with respect to the matter contained therein, into elementary and æthereal.

Under the æthereal world was included all that space above the uppermost element, viz. fire. This they supposed to be perfectly homogeneous, incorruptible, unchangeable, &c. The Chaldees placed an æthereal world between the empyreum and the region of the fixed stars. Beside which, they sometimes also speak of a second æthereal world, meaning by it the starry orb: and a third æthereal world, by which is meant the planetary region.

ÆTHIOPIA. See ETHIOPIA and ABYSSINIA.

ÆTHIOPS, *Mineral*, *Martial*, and *Antimonial*. See *CHEMISTRY Index*.

ÆTHUSA, FOOLS PARSLEY, in *Botany*. See BOTANY *Index*.

ÆTIANS, in *Church History*, a branch of Arians, who maintained that the Son and Holy Ghost are in all things dissimilar to the Father. See ÆTIUS.

ÆTIOLOGY, is that part of pathology which is employed in exploring the causes of diseases.

ÆTION, a celebrated painter, who has left us an excellent picture of Roxana and Alexander, which he exhibited at the Olympic games; it represents a magnificent chamber, where Roxana is sitting on a bed of a most splendid appearance, which is rendered still more brilliant by her beauty. She looks downwards, in a kind of confusion, being struck with the presence of Alexander standing before her. A number of little Cupids flutter about, some holding up the curtain, as if to show Roxana to the prince, whilst others are busied in undressing the lady; some pull Alexander by the cloak, who appears like a young bashful bridegroom, and present him to his mistress: he lays his crown at her feet, being accompanied by Ephetion, who holds a torch in his hand, and leans upon a youth, who represents Hymen. Several other little Cupids are represented playing with his arms; some carry his lance, stooping under so heavy a weight; others bear along his buckler, upon which one of them is seated, whom the rest carry in triumph; another lies in ambush in his armour, waiting to frighten the rest as they pass by. This picture gained Ætion so much reputation, that the president of the games gave him his daughter in marriage.

ÆTITES, or EAGLE-STONE, in *Natural History*, a stony or crustated stone, hollow within, and containing a *nucleus*, which, on shaking, rattles within. It was formerly in repute for several extraordinary magical as well as medical powers; such as preventing abortion, discovering thieves, and other ridiculous properties. The word is formed from *ætos*, "eagle," the popular tradition being, that it is found in the eagle's nest, whither it is supposed to be carried while the fe-

Actius
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Ætna.

male fits, to prevent her eggs from being rotten. It is found in several parts: near Trevoux in France, one can scarce dig a few feet, without finding considerable strata or beds of the coarser or ferruginous kind. They are originally soft, and of the colour of yellow ochre. But the finest and most valued of all the eagle-stones, are accidental flates of one or other of our common pebbles.

ÆTIUS, one of the most zealous defenders of Arianism, was born in Syria, and flourished about the year 336. After being servant to a grammarian, of whom he learned grammar and logic, he was ordained deacon, and at length bishop, by Eudoxus patriarch of Constantinople. Actius was banished into Phrygia on account of his religious opinions; but was recalled from exile on the accession of Julian, and was much esteemed by that emperor. He died, it is supposed, at Constantinople, about the year 366. St Epiphanius has preserved 47 of his propositions against the Trinity. His followers were called **ÆTIANS**.

ÆTIUS, a famous physician, born at Amida in Mesopotamia, and the author of a work entitled *Tetrabiblos*, which is a collection from the writings of those physicians who went before him. He lived, according to Dr Freind, at the end of the 5th or the beginning of the 6th century.

ÆTIUS, governor of Gallia Narbonensis in the reign of Valentinian III. forced the Franks who were passing into Gaul to repass the Rhine. He defeated the Goths; and routed Attila king of the Huns, who invaded Gaul with an army of 700,000 men. But the emperor, jealous of the merit of this great man, killed him in 454 with his own hand, under the pretence that he had permitted the invasion of the Huns, after Attila's defeat.

ÆTNA, (in the Itineraries *Æthana*, supposed from *aitō*, "to burn;" according to Bochart, from *athuna*, a furnace, or *ætuna*, darkness), now *Monte Gibello*: a volcano or burning mountain of Sicily, situated in N. Lat. 38°. E. Long. 15°.

This mountain, famous from the remotest antiquity, both for its bulk and terrible eruptions, stands in the eastern part of the island, in a very extensive plain, called *Val di Demoni*, from the notion of its being inhabited by devils, who torment the spirits of the damned in the bowels of this volcano.

Inconsistent
accounts
concerning
the magni-
tude of
Ætna.

Concerning the dimensions of Mount Ætna, we can scarcely extract any thing consistent, even from the accounts of the latest and most ingenious travellers. Pindar, who lived about 435 years before Christ, calls it the *Pillar of Heaven*, on account of its great height. All modern writers likewise agree, that this mountain is very high, and very large; but differ much both as to its height and magnitude: some making it no less than twelve miles high, others eight, others six, some four; while Mr Brydone, and Sir William Hamilton, who lately ascended to its highest summit, reduce its height to little more than two miles; nay, by some it is reduced to 10,036 feet, somewhat less than two miles. No less remarkable are the differences concerning its circumference: some making it only 60 miles round, others 100; and Signior Recupero, from whom Mr Brydone had his information in this respect, affirms it to be no less than 183 miles in circuit.

Ætna.

We are sorry to detract from the merit of Mr Brydone, or to involve in obscurity what he has been at so much pains to elucidate; but every person who compares the account of Mount Ætna's circumference, given by Signior Recupero, and to which Mr Brydone seems to have assented, with its apparent circumference on the map prefixed to that gentleman's tour through Sicily and Malta, must at once be struck with the prodigious disparity. Indeed, it is plain, that in the map, the geographer has not left room for any such mountain: nor can we help thinking, that, by comparing the distances of some of the Sicilian towns from one another, Signior Recupero's dimensions will be found enormously exaggerated.—Certain it is, that where the geographer has placed Catania, which stands at the foot of Mount Ætna, on one side, there is no more than 28 miles from the most distant point of the river Alcantara, which forms the boundary on the opposite side; so that a circle, whose radius is 14 or 15 miles, must encompass as much space as we can possibly think is occupied by the basis of Mount Ætna. Thus we shall reduce the circumference of this famous mountain to between 80 and 90 miles; and even when we do so, it is perhaps too great.

But if we are embarrassed with the circumference of Ætna, we are much more so with the accounts relating to its height; and one circumstance, particularly, creates almost insurmountable difficulties. It is agreed upon by all travellers, and among the rest by Sir William Hamilton, that from Catania, where the ascent first begins, to the summit, is not less than 30 miles. The descent on the other side we have no account of; but whatever supposition we make, the height of the mountain must be prodigious. If we suppose it likewise to be 30 miles, and that Mount Ætna can be represented by an equilateral triangle, each of whose sides is 30 miles, we will have an amazing elevation indeed, no less than 26 miles perpendicular!—Such a height being beyond all credibility, we must contract the sides of our triangle, in proportion to its basis. We shall begin with allowing ten miles for the difference between a straight line from Catania to the summit, and the length of the road, occasioned by the inequalities of the mountain; and supposing the descent on the other side to be somewhat shorter, we may call it 15 miles. Mount Ætna will now be represented by a scalene triangle, whose base is 30 miles, its longest side 20, and its shortest 15; from which proportions we will still find its height to be betwixt eight and nine miles.—This is still incredible; and when all the various relations concerning the height of Ætna are compared, we hope it will not be thought presumptuous in us to give it as our opinion, that the true dimensions of this mountain are as yet unknown. The following measures are given by different authors.

Height above the surface of the sea, 10,036 feet.

One hundred and eighty miles circumference at the base.—Faujas de St Fond, in his *Volcans du Vivarais*.

Height 12,000 feet.—Brydone. Tour to Sicily.

Height 2,500 toises.—La Platrière, said as from Recupero.

Height 1950 toises.—Diameter 30 miles.—Mentelle Geogr. comp.

Others make its height only 2000 toises, and its superficies 300 square miles.

Concerning

Concerning the products and general appearance of this volcano, authors are much better agreed.—The journey from Catania to its summit has been lately described by several travellers, M. D'Orville, Mr Brydone, Sir William Hamilton, M. Houel, and the Abbé Spallanzani. They all agree, that this single mountain affords an epitome of the different climates throughout the whole world: towards the foot, it is extremely hot; farther up, more temperate; and grows gradually more and more cold the higher we ascend. At the very top, it is perpetually covered with snow: from thence the whole island is supplied with that article, so necessary in a hot climate, and without which the natives say Sicily could not be inhabited. So great is the demand for this commodity, that the bishop's revenues, which are considerable, arise from the sale of Mount Ætna's snow; and he is said to draw 1000*l.* a-year from one small portion lying on the north side of the mountain. Great quantities of snow and ice are likewise exported to Malta and Italy, making a considerable branch of commerce. On the north side of this snowy region, Mr Brydone was assured, that there are several small lakes which never thaw; and that the snow mixed with the ashes and salt of the mountain are accumulated to a vast depth. The quantity of salts contained in this mountain, he, with great probability, conjectures to be one reason of the preservation of its snows; for salt increases the coldness of snow to a surprising degree.

In the middle of the snowy region stands the great crater, or mouth of Ætna; from which, though contrary to the usual method of travellers, we shall begin our particular account of this mountain. Sir William Hamilton describes the crater as a little mountain, about a quarter of a mile perpendicular, and very steep, situated in the middle of a gently inclining plain, of about nine miles in circumference. It is entirely formed of stones and ashes; and, as he was informed by several people of Catania, had been thrown up about 25 or 30 years before the time (1769) he visited Mount Ætna. Before this mountain was thrown up, there was only a prodigious large chasm, or gulf, in the middle of the above-mentioned plain; and it has been remarked, that about once in 100 years the top of Ætna falls in; which undoubtedly must be the case at certain periods, or the mountain behaved continually to increase in height. As this little mountain, though emitting smoke from every pore, appeared solid and firm, Sir William Hamilton and his companions went up to the very top. In the middle is a hollow, about two miles and a half in circumference, according to Sir William Hamilton; three miles and a half, according to Mr Brydone; and three or four, according to Mr D'Orville. The inside is crusted over with salts and sulphur of different colours. It goes shelving down from the top, like an inverted cone; the depth, in Sir W. Hamilton's opinion, nearly corresponding to the height of the little mountain. From many places of this space issue volumes of sulphureous smoke, which being much heavier than the circumambient air, instead of ascending in it, roll down the side of the mountain, till, coming to a more dense atmosphere, it shoots off horizontally, and forms a large track in the air, according to the direction of the wind; which, happily for our travellers, carried it exactly to the side opposite to which they

were placed. In the middle of this funnel is the tremendous and unfathomable gulf, so much celebrated in all ages, both as the terror of this life, and the place of punishment in the next. From this gulf continually issue terrible and confused noises, which in eruptions are increased to such a degree as to be heard at a prodigious distance. Its diameter is probably very different at different times: for Sir W. Hamilton observed, by the wind clearing away the smoke from time to time, that the inverted hollow cone was contracted almost to a point; while Mr D'Orville and Mr Brydone found the opening very large. Both Mr Brydone and Sir W. Hamilton found the crater too hot to descend into it; but Mr D'Orville was bolder: and accordingly he and his fellow traveller, fastened to ropes which two or three men held at a distance for fear of accidents, descended as near as possible to the brink of the gulf; but the small flames and smoke which issued from it on every side, and a greenish sulphur, and pumice stones, quite black, which covered the margin, would not permit them to come so near as to have a full view. They only saw, distinctly in the middle, a mass of matter which rose, in the shape of a cone, to the height of above 60 feet, and which towards the base, as far as their sight could reach, might be 600 or 800 feet. While they were observing this substance, some motion was perceived on the north side, opposite to that whereon they stood; and immediately the mountain began to send forth smoke and ashes. This eruption was preceded by a sensible increase of its internal roarings; which, however, did not continue; but after a moment's dilatation, as if to give it vent, the volcano resumed its former tranquillity; but as it was by no means proper to make a long stay in such a place, our travellers immediately returned to their attendants.

On the summit of Mount Ætna, Sir W. Hamilton observes, that he was sensible of a difficulty in respiration from the too great subtilty of the air, independent of what arose from the sulphureous smoke of the mountain. Mr Brydone takes no notice of this: which probably arose from the air being in a more rarefied state at the time of Sir W. Hamilton's observation than of Mr Brydone's; the barometer, as observed by the former, standing at 18 inches and 10 lines, by the latter at 19 inches $6\frac{1}{2}$ lines.

In these high regions there is generally a very violent wind, which, as all our travellers found it constantly blowing from the south, is perhaps most frequently directed from that point. Here Mr Brydone's thermometer fell to 27° .

The top of Ætna being above the common region of vapours, the heavens appear with exceeding great splendour.—Mr Brydone and his company observed, as they ascended in the night, that the number of stars seemed to be infinitely increased, and the light of each of them appeared brighter than usual; the whiteness of the milky way was like a pure flame which shot across the heavens; and, with the naked eye, they could observe clusters of stars that were invisible from below. Had Jupiter been visible, he is of opinion that some of his satellites might have been discovered with the naked eye, or at least with a very small pocket glass. He likewise took notice of several of those meteors called *falling stars*; which appeared as much elevated as when viewed from the plain; a proof, according to Mr Brydone,

done, that "these bodies move in regions much beyond the bounds that some philosophers have assigned to our atmosphere."

Extensive prospect.

To have a full and clear prospect from the summit of Mount Ætna, it is necessary to be there before sunrise; as the vapours raised by the sun, in the day time, will obscure every object: accordingly, our travellers took care to arrive there early enough; and all agree, that the beauty of the prospect from thence cannot be expressed.—Here Mr Brydone and Sir W. Hamilton had a view of Calabria in Italy, with the sea beyond it; the Lipari islands, and Stromboli, a volcano at about 70 miles distance, appeared just under their feet; the whole island of Sicily, with its rivers, towns, harbours, &c. appeared distinct, as if seen on a map. Massa, a Sicilian author, affirms, that the African coast, as well as that of Naples, with many of its islands, have been discovered from the top of Ætna. The visible horizon here is not less than 8 or 900 miles in diameter. The pyramidal shadow of the mountain reaches across the whole island, and far into the sea on the other side, forming a visible track in the air, which as the sun rises above the horizon, is shortened, and at last confined to the neighbourhood of Ætna. The most beautiful part of the scene, however, in Mr Brydone's opinion, is the mountain itself, the island of Sicily, and the numerous islands lying round it. These last seem to be close to the skirts of Ætna; the distances appearing reduced to nothing.

Division into three zones.

This mountain is divided into three zones, which might properly enough be distinguished by the names of *torrid*, *temperate*, and *frigid*: they are, however, known by the names of the *Piedmontese*, or *Regione culta*, the cultivated, or fertile region; the *Sylvosa*, woody, or temperate zone; and the *Regione deserta*, the frigid or desert zone or region. All these are plainly distinguished from the summit. The *Regione deserta* is marked out by a circle of snow and ice, which extends on all sides to the distance of about eight miles, beginning at the foot of the crater. Great part of this region is smooth and even. This is immediately succeeded by the *Sylvosa*, or woody region; which forms a circle of the most beautiful green, surrounding the mountain on all sides. This region is variegated with a vast number of mountains of a conical form, thrown up by Ætna in those eruptions which burst out from its sides. Sir W. Hamilton counted 44 on the Catania side, each having its crater, many with large trees flourishing both within and without the crater. All these, except a few of late date, have acquired a wonderful degree of fertility. The circumference of this zone, or great circle, according to Recupero, is not less than 70 or 80 miles. It is everywhere succeeded by the *Regione culta*; which is much broader than the rest, and extends on all sides to the foot of the mountain. Here terrible devastations are sometimes committed by the eruptions; and the whole region is likewise full of conical mountains thrown up by them. The circumference of this region is, by Recupero, reckoned 183 miles; but we have already given our reasons for rejecting these dimensions.—This region is bounded by the sea to the south and south-east; and on all other sides, by the river Semetis and Alcantara, which form the boundaries of Mount Ætna.

Regione deserta.

Regione Sylvosa.

The woody region descends eight or nine miles below the *Regione deserta*, but differs greatly in the temperature of its climate. Sir W. Hamilton observed a gradual decrease of the vegetation as he advanced; the under part being covered with large timber trees, which grew gradually less as he approached the third region, at last they degenerated into the small plants of the northern climates. He also observed quantities of juniper and tanfy; and was informed by his guide, that later in the season (he visited Ætna in June 1769) there are a great many curious plants, and in some places rhubarb and saffron in great plenty. In Carre's history of Catania, there is a list of all the plants and herbs of Ætna.

Ætna.

This region is extolled by Mr Brydone as one of the most delightful spots on earth. He lodged for a night in a large cave near the middle, formed by one of the most ancient lavas. It is called *La Spelonca del Capriole*, or the goats cavern; because it is frequented by those animals, which take refuge there in bad weather. Here his rest was disturbed by a mountain thrown up in the eruption 1766. It discharged great quantities of smoke, and made several explosions like heavy cannon fired at a distance; but they could observe no appearance of fire.

This gentleman likewise visited the eastern side of the *Regione Sylvosa*, intending to have ascended that way to the summit, and descended again on the south side to Catania, but found it impracticable. On this side, part of the woody region was destroyed in 1755, by an immense torrent of boiling water, which issued from the great crater. Its traces were still very visible, about a mile and a half broad, and in some places more. The soil was then only beginning to recover its vegetative power, which it seems this torrent had destroyed for 14 years. Near this place are some beautiful woods of cork, and evergreen oak, growing absolutely out of the lava, the soil having hardly filled the crevices; and not far off, our traveller observed several little mountains that seemed to have been formed by a late eruption. Each of these had a regular cup, or crater, on the top; and, in some, the middle gulf, or *voragine*, as the Sicilians call it, was still open. Into these gulfs Mr Brydone tumbled down stones, and heard the noise for a long time after. All the fields round, to a considerable distance, were covered with large burnt stones discharged from these little volcanoes.

Eruption of boiling water.

The woody region, especially the east side, called *Over-Carpinetto*, abounds with very large chestnut trees; the most remarkable of which has been called, from its size, *Castagno di Cento Cavalli*, or chestnut tree of a hundred horse. Mr Brydone was greatly disappointed at the sight of this tree, as it is only a bush of five large ones growing together: but his guides assured him, that all these five were once united into one stem; and Signior Recupero told him, that he himself had been at the expence of carrying up peasants with tools to dig round it, and found all the stems united below ground in one root. The circumference, as measured by Mess. Brydone and Glover who accompanied him, amounted to 204 feet. Here the barometer stood at 26 inches 5 lines and a half, indicating an elevation of near 4000 feet.

Regione Culta.

The Piedmontese district is covered with towns, vil-

Ætna. lages, monasteries, &c. and is well peopled, notwithstanding the danger of such a situation; but the fertility of the soil tempts people to inhabit that country; and their superstitious confidence in the saints, with the propensity mankind have to despise danger which they do not see, render them as secure there as in any other place. Here, Sir William Hamilton observes, they kept their vines low, contrary to the custom of those who inhabit Mount Vesuvius; and they produce a stronger wine, but not in such abundance: here also many terrible eruptions have burst forth; particularly one in 1669. At the foot of the mountain raised by that eruption, is a hole, through which Sir William Hamilton descended, by means of a rope, into several subterraneous caverns, branching out, and extending much farther than he chose to venture; the cold there was excessive, and a violent wind extinguished some of the torches. Many other caverns are known in this and the other regions of Ætna; particularly one near this place called *La Spelonca della Palumba*, (from the wild pigeons building their nests there.) Here Mr Brydone was told that some people had lost their senses, from having advanced too far, imagining they saw devils and damned spirits.

Subterra-
neous ca-
vern.

River Acis.

In this region the river *Acis*, so much celebrated by the poets, in the fable of Acis and Galatea, takes its rise. It bursts out of the earth at once in a large stream, runs with great rapidity, and about a mile from its source throws itself into the sea. Its water is remarkably clear; and so extremely cold, that it is reckoned dangerous to drink it: it is said, however, to have a poisonous quality, from being impregnated with vitriol; in consequence of which cattle have been killed by it. It never freezes, but is said often to contract a greater degree of cold than ice.

Houel's ob-
servations.

The following additional particulars relating to the eruptions, magnitude, scenery, and products, of this celebrated volcano, are chiefly collected from the *Voyage Pittoresque* of M. Houel, who appears to have surveyed it with greater accuracy than any former traveller.

The form of Mount Ætna is that of a cone, very broad at the base, which is more than 40 miles in circumference. From the bottom you ascend ten leagues before reaching its summit on the south side; and on any of the other sides, the way being not so straight, would be considerably longer. Ætna is entirely composed of substances that have been discharged from the volcano in its various explosions.

It appears from the quantities of marine bodies deposited all over the under part of Ætna, that it must have been once covered by the sea to at least one half of its present height. The whole island of Sicily, and the greatest part of Mount Ætna, have been, in our author's opinion, formed under water. But the period when the eruptions from this volcano first commenced, the manner in which the sea subsided, and the precise time at which it fell so low as its present level on the shores of Sicily, are facts concerning which we have no certain knowledge.

The general principle, however, M. Houel thinks may be regarded as undeniable. When this mountain stood half under water, the currents of the ocean would gradually accumulate upon it large masses, both of its own productions, such as shells, and bones of

fishes, and of various other matters, which would be intermixed with the volcanic matters discharged from the focus of the burning mount. In a long series of ages these strata of heterogeneous matters would naturally become so considerable as to form the enormous mass of mountains with which the volcano is now surrounded. The currents of the ocean might often convey the volcanic matters to a considerable distance from the volcanic focus. And there are mountains at no small distance from Ætna, which seem to have been produced in this manner. Those of Carlini, at the distance of 15 leagues, consist chiefly of a mixture of pozzolana with calcareous matters. At Lintini, and in places around it, there are distinct beds of pozzolana, scoria, and real lava, as well as others in which all these matters are blended together in a mass of calcareous matter. At Palazzolo, about 24 miles from the city of Syracuse, the sides of the hills having been cut by the streams which run down them, in many places to a considerable depth, display huge masses of lava, and extensive beds of pozzolana. In the neighbourhood of Noto there are also volcanic productions to be found.

Ætna.

At Pachino, where the island of Sicily forms an angle, there is a range of hills extending for several miles, which consist all of pozzolana.

The province of Val di Noto is more homogeneous in the matters of which its soil consists, than the two other dales of Sicily. These, in every hill which they contain, exhibit a vast variety of different matters. So amazing, indeed, is that variety, that they may be considered as exhibiting a collection of specimens of all the different materials which enter into the composition of the globe. In those two dales few volcanic productions have been yet observed. But it is not to be inferred for this reason that they contain but few. They may be hereafter discovered in great plenty. In the volcano of water at Maccalubbe, between Aragona and Girginti; in the baths of Castellamare, near Alcamo and Segeste; in the baths of Termini; in the isles of Lipari; in the hot waters of Ali, between Messina and Taormina, by the lake in the valley of Caltagirone; in all these places, which comprehend the whole circumference of Sicily, the influence of the volcano of Ætna is, in some measure, felt. Nay, it would even seem, that in these places there are so many volcanic craters. All of these are so disposed as to show that they existed prior not only to the volcanic matters, but to the other substances intermixed with them.

The waters of the sea have, in former times, risen much higher than at present. But how they retreated, or whether they are to continue stationary at their present height, we know not. For more than 2000 years, during which Sicily has been inhabited, and has had cities and harbours, the sea has not been observed either to recede or encroach in any considerable degree.

When the sea subsided from Mount Ætna, the mountain must have been covered over with such matters as the sea usually deposits; consequently with calcareous matters. A part of those matters would be indurated by the action of the atmosphere, while the rest would be carried down by the rain waters, and again conveyed into the ocean. The torrents of rain

water.

water which pour down the sides of Mount Ætna have furrowed its sides, by cutting out for themselves channels; and they have removed from its summit, and are still removing to a further distance, all the extraneous bodies upon it. In many places, they flow at present over a channel of lava, having cut through all the matters which lay above it: still, however, there remain in many places both calcareous matter and other marine productions, which show that this volcano has been once covered by the waters of the ocean. But these are daily wafting away; not only the rains, but men likewise, who carry them off as materials for lime and for building, conspire to deface them.

No fewer than 77 cities, towns, and villages, are scattered over the sides of Ætna. They are most numerous on the south side, where the temperature of the air is milder than on the north. Reckoning those cities, towns, and villages, one with another, to contain each 1200 or 1500 souls, the whole number of the inhabitants of Mount Ætna will then be 92,400, or 115,500. But it is certainly much more considerable.

Plate IV. fig. 1. exhibits a view of the north-east side of the mountain, taken at sea. The lower part presents to the eye very extensive plains entirely covered with lava of different thickness, on which vegetation has not yet made any progress. The nearer the shore the more barren is the ground; while the fertility of the soil increases as we advance farther inwards. The mountain is everywhere full of vast excavations; which our author considers as a proof, that instead of increasing in bulk, it is actually in a state of decay and diminution. The vast torrents of lava, which overspread the sides of it from time to time, he considers as insufficient to repair the waste occasioned by rains, rivulets, and torrents flowing down from the summit. Unless the eruptions, therefore, become more frequent than they have been for some time past, he supposes that, by degrees, the height of the mountain must be reduced to that of the surrounding beds of lava. He had not an opportunity of measuring the altitude of Ætna himself; but he observes, that it had been done by the celebrated M. de Saussure, who found the elevation to be 10,036 feet. This was done on the 5th of June 1773, at 20 minutes after seven in the morning. The height of the barometer on the most elevated part at the brink of the crater was 18 inches $11\frac{1}{4}$ lines; which, by the necessary corrections, is reduced to 18 inches $10\frac{1}{2}$ lines. At the same time the mercury at Catania, placed only one foot above the level of the sea, stood at 28 inches $2\frac{1}{8}$ lines; which must be reduced to 28 inches $1\frac{1}{8}$ lines, on account of the necessary corrections for the thermometer.

From Giana our author had an opportunity of contemplating the vast number of calcareous mounts scattered over that part of Ætna; which (he says) "are nothing more than fragments, the slender remains of those enormous masses which have been deposited all around the base of Mount Ætna; and are a very curious monument of the revolutions which this mountain has undergone." They are of a true calcareous nature; and the inhabitants are accustomed to supply themselves with limestone from them. They also use stones of which these mounts are composed for the purpose of building; as the lava is so hard that it can-

not be cut without the greatest difficulty, and they have no other stone in these parts.

Leaving this place, our author travelled over several extensive plains of lava, covered on each side of the way with stunted trees, but without any cultivation; the lava being of that kind which is very unfavourable to the growth of vegetables. Arriving at St Leonardo, he observed the course of the eruption of water which happened in 1755.

This water took its course down the west side of the mountain: and the channel which it cut for itself is still visible. The eruption of water from burning mountains is still much less frequent than that of lava or half vitrified solid matters, ashes, &c. though that of water, and even mixed with the shells of marine animals (though we are not told whether it was salt or not), has sometimes been observed in other volcanoes, particularly Vesuvius. The eruption we now speak of happened in the month of February 1755. It was preceded by an exceedingly thick black smoke issuing from the crater, intermixed with flashes of fire. This smoke gradually became thicker, and the bursts of flame more frequent. Earthquakes and subterraneous thunder convulsed the mountain, and struck the inhabitants of the adjacent parts with the utmost terror. On Sunday the second of March, the mountain was seen to emit a huge column of smoke exceedingly dense and black, with a dreadful noise in the bowels of the earth, accompanied also with violent flashes of lightning. From time to time there were loud cracks, like the explosions of cannon; the mountain appeared to shake from its foundations; the air on that side next Mascali became very dark, and loud peals of thunder were heard. These seemed to issue from two caverns, considerably below the summit, on the side of the mountain, and were accompanied with violent blasts of wind like a tempest.

These terrible phenomena continued and increased; Ætna seemed ready to swallow up at once all those materials which it had been for so many years disgorging, or rather about to sink at once into the bowels of the earth from whence it appeared to have been elevated. The prospect was far beyond any idea that can be given by description of this tremendous scene. The inhabitants were alarmed beyond measure; the sight of the flames driven by the winds against the sides of the mountain, the shocks of the earthquake, and the fall of rocks, struck the imagination with a horror not to be conceived. During this dreadful commotion an immense torrent of water was emitted from the highest crater of the mountain. The whole summit of Ætna was at that time covered with a thick coating of snow. Through this the boiling water directed its course eastward; and, in its passage, met with frightful precipices. Over these it dashed with the utmost violence, adding its tremendous roaring to the complicated horrors of this awful scene. The snow, melting instantaneously as the boiling torrent advanced, increased its destructive power by augmenting its quantity, while the mischievous effects of the heat were scarce diminished by reason of the immense quantity of boiling liquid which continued to pour from the summit of the mountain.

This boiling torrent having dashed its awful catafracts from one chain of rocks to another, at length reached

Account of the north-east side of the mountain.

Supposed to be in a state of decay.

Saussure's account of the height of Ætna.

Mountains of calcareous matter.

Particular account of the eruption of water in 1755.

reached the cultivated plains, which it overflowed for a number of miles. Here it divided itself into several branches, forming as many deep and rapid rivers; which, after several other subdivisions, discharged themselves into the sea.

Though the mountain continued to discharge water in this manner only for half an hour, the ravages of it were very terrible. Not only those of common inundations, such as tearing up trees, hurrying along rocks and large stones, took place here, but the still more dreadful effects of boiling water were felt. Every cultivated spot was laid waste, and every thing touched by it was destroyed. Even those who were placed beyond the reach of the torrent, beheld with inexpressible horror the destruction occasioned by it; and though the alarming noises which had so long issued from the mountain now ceased in a great measure, the shocks of earthquakes and the violent smoke which continued to issue from the mountains, showed that the danger was not over. Two new openings were now observed, and two torrents of lava began to make their way through the snow.

On the 7th of March a dreadful noise was again heard in the bowels of the mountain, and a new column of very thick and black smoke began to issue from it. A horrid explosion of small stones succeeded; some of which were carried as far as the hills of Mascali, and great quantities of black sand to Messina, and even quite over the strait to Reggio in Calabria. On the shifting of the wind to the northward this sand reached as far as the plains of Agosta. Two days after the mountain opened again, and a new torrent of lava was discharged; which, however, advanced very slowly towards the plain, moving only at the rate of a mile in a day. It continued to flow in this manner for six days, when every thing appeared so quiet, that the Canon Recupero set out to view the changes which had taken place.

Course of the current traced by Recupero.

That gentleman's design was to trace the course of the dreadful torrent of water above mentioned. This he was very easily enabled to do by the ravages it had made; and, by following the channel it had cut all the way from the sea to the summit of the volcano, he found that this immense quantity of water had issued from the very bowels of the mountain. After issuing from the crater, and increasing its stream by passing through and melting the snow which lay immediately below the summit, it destroyed in an instant a fine and extensive forest of fir-trees. All of these were torn up by the violence of the current, though many were no less than 24 or 30 inches in diameter. He observed that the great stream had, in its descent, divided itself into four branches; and these had again subdivided themselves into several smaller ones, easily distinguishable by the quantity of sand they had deposited. Afterwards reuniting their streams, they formed many islands, and rivers 900 feet in breadth, and of a depth which could not easily be determined. Proceeding farther down, and still forcing its way among the beds of old lava, the channel of the waters was widened to 1500 feet, until it was again contracted in the valleys as before. Every object which stood in the way of this tremendous torrent was moved from its place. Enormous rocks were not only hurried down, but several of them moved to more elevated situations than

those they formerly occupied. Whole hills of lava had been removed and broken to pieces, and their fragments scattered along the course of the river, and the valleys were filled up by vast quantities of sand which the waters had deposited. Our author observed, that even at the time he visited the mountain, about ten years after the eruption, the whole side of it still bore the marks of this deluge.

Ætna.

On M. Houel's arrival at Jaci Catena, he inquired for the physician of the place; it being customary for strangers to do so who want to learn any thing concerning the curiosities of the country, as the physicians there are generally those who have any pretensions to literature. By this guide he was shown a well which they call *Holy Water*. There is a slight of steps from the surface of the ground to that of the water. The well itself is 20 feet wide and 40 feet deep. It is supplied by three different springs, each of which is said to have a peculiar taste. The physician informed our author, that one of them resembled milk in its taste; another tasted like soap; and the third had the taste of common water: but our author, after tasting each of them, could not find any remarkable difference.

Account of a remarkable well,

In his way to La Trizza, our author discovered some very ancient baths with stoves. They had been built here on account of a spring of warm sulphureous water, supposed to be excellent for the cure of cutaneous disorders; and for which purpose they are still made use of. They are now called the *Springs of St Venera*, of whom there is an image here. The fountain from which they flow is on a level with the surface of the ground. The water tastes very disagreeably of sulphur; and deposits a quantity of white impalpable powder, adhering to herbs and stones, over which it passes. This substance our author calls the *cream of sulphur*; though it is probably a selenitic substance formed by the decomposition of the sulphur, and the union of its acid with some calcareous matter which held it in solution before.

Ancient baths discovered.

Springs of St Venera.

From this place our author proceeded to the sea-port of Trizza, a small place, which with the adjacent country contains only about 300 inhabitants. Off the harbour of this place is a basaltic rock, which seems to be only the remains of a much larger one destroyed by the action of the air. All around are long ranges of basaltes, the species of which are very various.

Basaltic rocks about Trizza.

The rocks of the Cyclops stand round the small harbour of La Trizza; and from this view we perceive a number of rocks of very different heights. All of them appear more or less above water, though some are so low that they cannot be seen without approaching very near; and this circumstance renders the harbour inaccessible to vessels of any considerable burden, at the same time that, by reason of the depth of the sea, it is impossible either to cut or unite them by a mole. The principal of these rocks is the extremity of an island, one half of which is composed of lava placed on a basaltic base; over this is a crust of pozzolana, combined with a kind of white calcareous matter of a pretty hard and compact consistence; and which, by the action of the air, assumes the appearance of knotty porous wood. On this subject our author observes, that "the rock at some former period, had become so hard as to split, and the clefts were then filled up with

Rocks of the Cyclops.

with

with a very hard matter which was porous on all sides like scoriæ. That matter afterwards split also; leaving large interstices, which in their turn have been filled up with a kind of compound yellow matter. The island appears to have been formerly inhabited, but is at present destitute both of inhabitants and of culture, only the people of La Trizza feed a few goats upon it."

Different kinds of basaltes.

To the southward of the harbour of La Trizza we observe several fragments of basaltes, both in the form of needles, and in that of prismatic columns of a very regular form, and which may be easily separated from one another. From the position in which these fragments are disposed, it appears that the mass to which they belong must have suffered some very violent shock; otherwise such huge rocks could never have been broken, overturned, and scattered in directions so very different from their original positions. In one of these ruins there are some parts harder than the rest, which withstand the action of the air, while the intervening spaces yield to it, and appear to be thus destroyed. In some others this effect is much more remarkable; because the column happens to be much farther advanced towards a state of dissolution, the parts of which they consist being already disjointed; and in each of those which project we perceive a fissure: which shows that each of these parts may be divided into two. "They are indeed (says our author) actually divided, and display a convexity issuing from a concavity, like a pile of hats placed one upon another, when they are removed one by one; which is a very curious singularity."

Promontory of the Castell d'Acì described.

Continuing his journey still southward, our author arrived at the promontory of the Castell d'Acì. This is the most singularly curious of all that are in the neighbourhood of Ætna. The ancient mass of it is enclosed between two bodies of lava of a more modern origin. These compose the rocks on which Castell d'Acì is situated, and which lie under the soil of the adjacent country. Beyond that city are the immense plains of the lower part of Ætna. These gradually rise till they reach the summit, which is hid among the clouds. The promontory is almost entirely composed of basaltes, the interstices of which are filled up with a yellowish matter, which seems to be a clay nearly of the same nature with that formerly taken notice of in the island of La Trizza. It also covers the mass of basaltes, and has produced both the superior and anterior parts of the promontory. Here our author saw a number of women employed in washing webs of cloth in the sea: and takes notice of the dexterous method they have of lifting it up in folds, and packing it on their heads in bundles without receiving any assistance. At the foot of this promontory are many curious basaltic rocks.

Great quantity of basaltes found on Ætna.

All along the eastern side of Mount Ætna the soil is broken, but filled with beautiful varieties of basaltes, highly worthy of observation. Indeed, according to our author's opinion, there is no volcano in Europe so rich as Ætna in basaltes, nor where so many curious figures of it are to be seen.

M. Houel's journey to the great chestnut tree.

M. Houel having spent some more time in visiting the basaltic columns around the foot of the mountain, set out from Acì to visit the famous chestnut tree for an hundred horses which we have already mentioned. In

his way thither he passed through the villages of Fortezza, Mangamo, St Leonardo, St Matteo, and La Macchia. The landscapes of each of these places by itself are extremely beautiful; but the country between them is a frightful wild desert, presenting to the eye nothing but extensive plains of black lava, which at a distance have the appearance of vast quantities of pit-coal. The roads became rougher as they advanced; but the adjoining fields assumed a more smiling aspect. The reason of this is, that the torrents of lava (by which the plains are rendered unfit for vegetation for a great number of years) have rolled rapidly down the more steep sides of the mountain without destroying the fertility of the soil.

Ætna.

Travelling through very difficult roads, and often incommoded with dangerous precipices, our author at last arrived at the celebrated chestnut tree, which was the chief object of this journey. He observes, that, all over this side of the mountain the chestnut trees thrive very well, and are carefully cultivated by the inhabitants. They are worked into hoops for casks, and a considerable trade is carried on in this article. The great one which he came to visit, exceeds the size of other trees so much that it cannot fail to excite the greatest admiration. It has its name from the following circumstance. Jean of Arragon spent some time in Sicily on her way from Spain to Naples. While here, she visited Mount Ætna, attended by her principal nobility; and happening to be overtaken by a storm, they took shelter under this tree, whose branches were sufficiently extensive to cover them all. By others, however, this story is treated as a mere fable.

According to our author's account, this chestnut tree is 160 feet in circumference, which is less than Mr Brydone's account of it, but quite hollow within: which, however, affects not its verdure; for the chestnut tree, like the willow, depends upon its bark for subsistence, and by age loses its internal part. As the cavity of this enormous mass is very considerable, the people have built a house in it, where they have an oven for drying nuts, almonds, and chestnuts, &c. of which they make conserves. They frequently supply themselves with wood from the tree which encircles their house, so that it seems likely, in a short time, to go to ruin through the thoughtless ingratitude of its inhabitants, to whom it gives protection.

It has been thought that this tree was composed of a number of others grown together; but our author is of a different opinion. For he supposes that the bark and outer part of the wood have been rent asunder, and that by a natural motion the divided parts of the bark seeking to reunite, or rather to shelter themselves from the action of the external air, are bent inwards so as to form circular arcs, which may indeed be taken for so many different trees, though they appear properly to belong to the same trunk.

Besides this, there is abundance of other trees in the neighbourhood very remarkable for their size. Our traveller was shown a number of young trees of the same species, all very beautiful and straight, and almost as smooth as polished marble. One of these was 38 feet in circumference, and there was a number of others nearly of the same size. Among these there were seven standing together, which have received the name of the seven brethren. Another is denominated

Ætna. minated *the ship*, from the general figure of its top, which has some slight resemblance to a ship. Its diameter is 25 feet, so that the circumference cannot be less than 75. In these extensive forests, however, there are chestnut trees of every age and size.

Snow grotto described.

Forest of pines in the way to it.

Our author's next visit was paid to a snow grotto, being one of those magazines where that article, so necessary in the hot climate of Sicily, is preserved for use. In his way thither he visited the forest of pines; which is so much surrounded by rocks and precipices, that it is scarce accessible; and vast numbers of the trees are dying of old age. Some of the neighbouring peasants, however, now and then attempt to carry them off. Our author saw one of them at this work. It was drawn by oxen, who were yoked to it by a chain connected with the beam by an iron cramp. But the extreme roughness of the road made the tree leap and bound in such a manner, that the poor creatures were every moment in danger of having their legs broken, or being hurried over precipices along with their driver; accidents which happen not unfrequently, and which render this occupation less generally practised than otherwise it would be.

The snow grotto is but lately formed by the action of the waters under the beds of lava, and carrying away the stratum of pozzolana below them. It is situated on a mount named *Finocchio*, which, though of very considerable size, is only a protuberance on the side of Ætna. It has been repaired in the inside at the expence of the knights of Malta, who have hired this as well as several other caverns in the mountain for the purpose of holding snow, which they have still more occasion for in their island than the inhabitants of Sicily. There are two openings above, at which they throw in the snow; and flights of steps have been cut to these as well as in the internal parts. A considerable extent of ground is levelled and enclosed with high walls above the grotto; so that when the wind, which at this elevation blows with great violence, carries the snow down from the higher parts of the mountain, it is stopped and detained by the walls of this enclosure. It is then thrown into the grotto, where the thickness of the beds of lava which cover it prevents any imprefion from the summer heat. When the season for exportation comes on, the snow is put into large bags, and pressed into them as close as possible. Thus it is rendered compact and heavy, and likewise runs less risk of being affected by the heat. It is then carried out upon men's shoulders, and conveyed to the shore on mules. Before it is put into the bags, the lumps of snow are carefully wrapped up in leaves, which is another preservative; at the same time that the fresh congelation of the little which melts, unites the masses so together, that our author informs us he has seen pieces of the snow preserved in this manner which looked like the fairest and most transparent crystal.

How the snow is prevented from melting during exportation.

Account of Mount Rosso.

Our author's next excursion was to Mount Rosso, or the Red Mountain, which is one of the mouths of Ætna, and through which it discharges from time to time great quantities of lava, sand, ashes, &c. It is the most celebrated of all the numerous mouths which have opened on the side of the mountain, though it has become so noted only for having poured forth the matter of the great eruption in 1669, and which is the most remarkable of any recorded in history.

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“When a new crater (says our author) is formed on Mount Ætna, it is always in consequence of some shock that is powerful enough to break the arches of its caverns. Doubtless it is inconceivable that there should be any agent endowed with such force; but when such a fracture is once made, it is necessarily very large, and the surface of the ground above cannot but be broken in several different places at considerable distances from one another. The matter which is discharged always issues from the principal opening and those adjoining to it. None of these mouths, however, continue open, excepting that which is directly in the line in which the matter is discharged; the lava soon choking up those which are in a more oblique direction.

Ætna. New craters how formed.

Our author went down one of these openings with torches; but could not reach the bottom, and was obliged to return on account of the extreme cold. The descent was extremely difficult, and became more so in proportion as he advanced. This crater is of an oval form, and the opening through which he descended was in one extremity: but he was tempted to think that the crater which rises above it had been formed of matter discharged by another mouth: or perhaps it might have had a more central opening, through which the stones, sand, &c. which form the crater, were discharged.

Four of the mouths of this mount appear to be composed of a reddish pozzolana, which has procured it the name of the *Red Mountain*; but when we ascend the pyramids, or rather funnels which they form, we find them composed of different coloured layers of sand. Some of these are of a bluish-gray colour, others of a fine yellow, and some of a kind of green formed by a mixture of gray and yellow, while others are of a red colour. A great number of small crystals, black schoerls, and granites, are found among them, as well as pieces of scoria, which had been discharged by the volcano in the form of a thick and glutinous matter. All these mouths have internally the form of a funnel, and their shape is nearly that of a mutilated cone or round pyramid. This is the natural and unavoidable consequence of the perpendicular fall of the pulverized matter which the volcano discharges from the orifice at the bottom. The sides of the craters are not all of one height; the parts to the east and west being considerably higher than the intermediate summits, because the currents of the ashes passed alternately from east to west, and fell upon these sides in greater quantities than on the others; which circumstance has given to this volcano the appearance of having two summits.

M. Houel, having finished his observations on Monte Rosso, returned to the convent of Nicolosi, which is now only a house for the entertainment of travellers. The Benedictines of Catania, to whom it belongs, visit this place only when in an ill state of health, as the purity of the air renders it very salutary to the human constitution. A solitary brother, however, resides here to take care of the house, and to superintend the cultivation of the neighbouring plains. Those fathers once possessed an extensive and very fertile tract of land in this neighbourhood; but the eruptions of Ætna have rendered it totally incapable of cultivation. This house stands at a very considerable height, being no less than 2496 feet above the level of the sea.

Convent of Nicolosi described.

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Ætna.
Grotto of
the goats
described.

ting out from this place three hours before day, our traveller directed his course towards the grotto of the goats. In his way thither, he passed over several plains of lava, some of them ancient and others more modern: but the roads were extremely rough and dangerous; or rather, as our author expresses himself, there was no track or path meriting the name of a road. In two hours they reached the Regione Sylvoſa, where an immense foreſt ſurrounds the mountain, and which has undoubtedly been planted by the hand of nature: for there the ground is ſo high, ſo full of precipices, and ſo entirely uninhabitable, that no human being could ever think of making plantations on it; nor is it to be ſuppoſed that the winds could take up ſeeds from the plains to ſow them on ſuch a lofty ſituation.

Beautiful
appearance
of the fo-
reſts of
Ætna.

Theſe maſtiffic foreſts of Ætna afford a ſingular ſpectacle, and bear no reſemblance to thoſe of other countries. Their verdure is more lively, and the trees of which they conſiſt are of a greater height. Theſe advantages they owe to the ſoil whereon they grow; for the ſoil produced by volcanoes is particularly favourable to vegetation, and every ſpecies of plants grows here with great luxuriance. In ſeveral places where we can view their interior parts, the moſt enchanting proſpects are diſplayed. The hawthorn trees are of an immense ſize. Our author ſaw ſeveral of them of a regular form, and which he was almoſt tempted to take for large orange trees cut artificially into the figures they reſented. The beeches appear like as many ramified pillars, and the tufted branches of the oak like cloſe buſhes impenetrable to the rays of the ſun. The appearance of the woods in general is exceedingly pictureſque, both by reaſon of the great number and variety of the trees, and the inequality of the ground, which makes them riſe like the ſeats in an amphitheatre, one row above another; diſpoſing them alſo in groups and glades, ſo that their appearance changes to the eye at every ſtep; and this variety is augmented by accidental circumſtances, as the ſituation of young trees among others venerable for their antiquity; the effects of ſtorms, which have often overturned large trees, while ſtems ſhooting up from their roots, like the Lernean hydra, ſhow a number of heads newly ſprung to make up that which was cut off.

Grotto of
the goats,
how form-
ed.

About three hours after the departure of our travellers from St Nicholas, they reached the grotto of the goats. It is formed by a bed of lava, which having flowed over a pile of ſand and pozzolana while in a fluid ſtate, ſettled and cooled in that ſituation; and the ſand or pozzolana being afterwards carried off by the filtration of water through the lava, a void ſpace has been left, which the torrents have gradually enlarged to its preſent ſize.

This grotto ſtands about 5054 feet above the level of the ſea, according to the calculations of M. de Sauffure. It affords a retreat for thoſe travellers who viſit the ſummit of Ætna, who generally reſreſh themſelves by taking a repaſt and making a fire at the entry, for which there is plenty of dry wood at hand; while the ſand ſerves for a bed to reſt upon. Here our author and his company ſupped, and about midnight ſet off for the ſummit. They had the advantage of the moon light; and our author adviſes alſo thoſe who intend to viſit the top of Ætna to take ſuch a time for

their journey as may enable them to enjoy this advantage. As they advanced beyond the grotto of the goats, the trees became gradually thinner. In a ſhort time they were ſo thin, that they might readily be counted; and, proceeding ſtill farther, only a very few were ſeen ſcattered here and there, whole beauty and ſize were diminiſhed ſeemingly in proportion to their numbers. A few clumps of trees and ſome tufts of odoriferous herbs were now only to be ſeen; and in a little time theſe alſo became thinner, aſſuming a withered or ſtunted appearance. Then they are nothing but the languiſhing remains of an abortive vegetation; and a few paces further even this diſappeared, and the eye was preſented only with barren ſand.

Ætna.
Account of
the height
of parts of
Ætna.

Having now got above the region of the trees, they entered the third, which our author denominates the region of ſnow and ſterility. The wind became more briſk and keen as they advanced, ſo that they could ſcarce keep their hats upon their heads; and our author loſt his, though tied on with a handkerchief. Here they were frequently obliged to croſs conſiderable ſtreams of water formed by the melting of the ſnow. In general the ſurface was ſufficiently hard to bear them, but our author's mule once ſunk up to her belly, and was not extricated without great difficulty.

Having at laſt overcome all difficulties, they arrived at the large plain on the ſummit of Ætna, and in the middle of which is the crater of the volcano. It is entirely compoſed of lava, cinders, ice, and ſnow; and has been ſtyled, ironically as our author thinks, *Monte Frumete*. Here the wind continued to blow with exceſſive violence; and our author informs us, that in order to have any notion of its keenneſs, we muſt be accuſtomed to feel it on ſome very elevated ſtation, as it is impoſſible to judge from what we feel at inferior altitudes. They took ſhelter behind a lump of lava, the only one which appeared in the whole plain, and, which our author ſays, would ſeem deſigned expreſly for the ſhelter of travellers. Here they lay, wrapped up in their cloaks, for an hour: but as ſoon as it was day, ſo that they could diſtinguiſh the place where the ſun was to riſe, they got up and advanced towards the ruins of the building known by the name of the *Philoſopher's Tower*. The wind ſtill blew ſo violently, that after an effort of four minutes they fell down ex-
hausted: but the extreme cold obliging them again to get up, they made a ſecond attempt; and after ſeveral intermiſſions of this kind, at laſt accompliſhed their deſign. They were ſurpriſed, however, to find nothing but the corner of a wall not more than two feet high, conſiſting of two rows of unpoſſiſhed ſtones; great part of it having been probably buried by the ſand and other matters diſcharged by the mountain. Here, being ſheltered from the wind, and the day advancing, they began to enjoy the glorious proſpect which every moment became more extenſive. At the riſing of the ſun, the horizon was ſerene, without a ſingle cloud. "The coaſt of Calabria (ſays our author) was as yet undiſtinguiſhable from the adjoining ſea; but in a ſhort time a fiery radiance began to appear from behind the Italian hills, which bounded the eaſtern part of the proſpect. The ſeedy clouds, which generally appear early in the morning, were tinged with purple; the atmosphere became ſtrongly illuminated, and, reflecting the rays of the riſing ſun, appeared filled with a bright effulgence of

Wind ex-
ceſſive
violence
here.

Extenſive
proſpect.

Ætna. of flame. The immense elevation of the summit of Ætna made it catch the first rays of the sun's light, whose vast splendour, while it dazzled the eyes, diffused a most cherishing and enlivening heat, reviving the spirits, and diffusing a pleasant sensation throughout the soul. But though the heavens were thus enlightened, the sea still retained its dark azure, and the fields and forests did not yet reflect the rays of the sun. The gradual rising of this luminary, however, soon diffused his light over the hills which lie below the peak of Ætna. This last stood like an island in the midst of the ocean, with luminous points every moment multiplying around, and spreading over a wider extent with the greatest rapidity. It was as if the universe had been observed suddenly springing from the night of non-existence. The tall forests, the lofty hills, and extensive plains of Ætna, now presented themselves to view. Its base, the vast tracts of level ground which lie adjacent, the cities of Sicily, its parched shores, with the dashing waves and vast expanse of the ocean, gradually presented themselves, while some fleeting vapours, which moved swiftly before the wind, sometimes veiled part of this vast and magnificent prospect." In a short time every thing was displayed so distinctly, that they could plainly recognize all those places with which they were before acquainted. On the south were seen the hills of Camerata and Trapani; on the north, the mounts Pelegrino and Thermini, with the celebrated Enna once crowned with the temples of Ceres and Proserpine. Among these mountains were seen a great many rivers running down, and appearing like as many lines of glittering silver winding through a variety of rich and fertile fields, washing the walls of 28 cities, while their banks were otherwise filled with villages, hamlets, &c. rising among the ruins of the most illustrious republics of antiquity. On the south and north were observed the rivers which bound by their course the vast base of Mount Ætna, and afford a delightful prospect to the eye; while at a much greater distance were seen the isles of Lipari, Alicudi, Felicocide, Parinacia, and Stromboli.

Philosopher's tower described.

Description of the great crater.

Having enjoyed for some time the beauty of this magnificent prospect, our author set about making a draught of the place from which the view was taken; and at length accomplished it, notwithstanding the great impediments he met with from the wind. Among the objects which he delineated on this occasion, the Philosopher's Tower was one. It seems, he says, not to be very ancient; neither the materials of which it consists, nor the mode of architecture, bearing any resemblance to those of the Greeks and Romans. The surrounding plain seems to consist entirely of a black sand intermixed with pieces of scoria, which have been formerly thrown out by the volcano. Beyond that plain, which rises gently, appears a cone, the summit of which is the volcanic crater. When viewed from the south side, on which they stood, this crater seems to consist of a number of small hills. Into these it was broken by the emission of the boiling torrent in the year 1755. When discharged from the crater, these waters spread towards the right, and at the distance of a mile eastward fell in a cascade from a prodigious height.

The violence of the wind beginning now to abate a

little, the travellers set out for the very summit, in order to take a view of the great crater; in which journey (our author says) it would be difficult to make people, who have never engaged in such enterprises, comprehend all the obstacles they had to encounter. This cone (the little mountain mentioned by Sir William Hamilton) is composed of ashes, sand, and pozzolana, thrown up at different times by the volcano. The materials are so loose, that the adventurous traveller sinks about mid-leg at every step, and is in constant terror of being swallowed up. At last, when the summit is reached, the sulphureous exhalations, which are continually emitted from the pores of the mountain, threaten suffocation, and irritate the fauces and lungs in such a manner as to produce a very troublesome and incessant cough. The looseness of the soil, which gives way under the feet, obliges the traveller, every now and then, to throw himself flat on his belly, that so he may be in less danger of sinking. In this posture our author viewed the wide unfathomable gulf in the middle of the crater; but could discover nothing except a cloud of smoke, which issued from a number of small apertures scattered all around, and accompanied with a kind of noise. Another and more dreadful sound, however, issues from the bowels of the volcano, and which, according to our author, "strikes the heart with terror, so that all the strength of reason is necessary to prevent the observer from flying with precipitation from such a dreadful place." Several travellers who had visited this cone before him, were so terrified by these dreadful sounds, that they fled with the utmost haste till they arrived at the foot of the mountain.

Ætna.

Horrid noises issue from the burning gulf.

Our author compares these sounds to a discharge of cannon in the wide abyss; the noise of which is rebellowed throughout all the caverns, and produces a sound perhaps the most alarming that can be imagined; and during the short space in which he listened, several of these discharges were heard to follow one another almost uninterruptedly.

This dreadful noise, our author, with very great probability, supposes to be occasioned by the explosions of the internal fire, or, as he calls it, the *focus* of the volcano; which, striking against the sides of these immense caverns, the sounds produced are re-echoed through their cavities, and probably multiplied in an extraordinary manner; so that what would be only a slight explosion in the open air, occasions a sound more tremendous than the loudest thunder. To such as are convinced of this, and have sufficient courage to resist the first impressions which these sounds must unavoidably occasion, they will in a short time not only appear exceedingly sublime, but, by their variety, even somewhat agreeable. "They enable us (says our author) to form some conception of the space through which they must pass before they reach the ear, and of the vast extent and width of the hollows of the mountain."

Having for some time contemplated this awful spectacle, our author wished to measure the crater by walking round it, but found this impossible. On the north side the surface is hard and smooth, the ashes having been so far dissolved by the moisture deposited by the smoke as to cement into one uniform mass. This is sometimes dissolved even into a fluid state, in such a

Impossible to walk round the crater.

Ætna. manner as to run down the sides of the cone; so that after several attempts, he was at last obliged to abandon his design.

Figure of the crater.

Fig. 2. exhibits a view of the crater of Ætna taken on the brink of the east side. The fore ground (*aa*) of the figure is one division of the crater. Beyond it are two eminences, *b* and *c*, higher than that on which some human figures are represented. All the three form a triangle nearly equilateral; but, when viewed from any considerable distance, only two of them can be seen; for which reason the Sicilians have termed the mountain *bicornis*, or double-horned.

The smoke, as represented in the figure, issues from all quarters, either from chinks or holes scattered over the whole crater. But the situation of the principal mouth is in the midst of the three eminences. Its diameter, when our author visited this mountain, was only about 60 feet, and so filled with smoke that nothing remarkable could be discovered. From the height *d*, the rock situated on the left side of the print, and on which the human figures are represented, all the way to the rock *e* on the right, the distance is no more than 900 feet. Our author observed, that the cone is not exactly in the middle of the plain, but is situated more towards the north than the south. He did not attempt to cross the central valley *f*, on account of the looseness of the ground, and that there was no object apparently worthy of the risk he must run in so doing. At the nearest view he took, it was only observed that there was snow lying in several parts of it, though the heat which otherwise prevailed seemed to be very intense.

The smoke which issues from the crater of Ætna is generally carried in a direction from south to north; and, as it brings along with it a considerable quantity of water, the latter, condensed by the cold winds, runs down the side of the mountain in plentiful streams, and often leaves pretty permanent marks of its course.

Eruption of water in 1755 accounted for.

In this manner he accounts for the great eruption of water in 1755, which he supposes to have been occasioned only by an unusual quantity of water falling into the burning focus of the mountain, there rarefied into steam, and afterwards condensed by the coldness of the atmosphere.

South wind generally prevalent on the top of Ætna.

Like other travellers to Mount Ætna, this gentleman found the wind blowing from the south; and he is of opinion, that a south wind blows here more frequently than any other, as he did not observe any channels cut by the water on any other side than the north. He had several opportunities of making this observation, having frequently visited the top of Ætna, and always paid attention to the crater. The sand on the east and west sides was always loose, while that on the north was compacted into a solid body. The three summits were of a later date than the rest of the crater, having been probably thrown up by some eruption which had burst it asunder. The black spots on the fore-ground represent a number of hillocks about the size of mole-hills, from which a sulphureous vapour constantly issues, and by which the adjacent ground is tinged of an ochrey colour. This vapour issues from the crevices with a kind of hollow whistling noise; which with the volcanic thunder, smoke, and noxious smell, render it very disagreeable to stay here even for a few moments.

The smoke is represented in the figure precisely as it appeared on the day that he ascended, which was very

warm. But it does not always rise in this manner; for when the cold is very intense, it collects into a body, and thickens around the edge of the crater: on which occasion it is condensed into water, which diffuses itself around the edge of the crater, and mixing with the ashes converts them into a kind of clay. The cold on the top of this mountain is so intense, that travellers very often find their clothes insufficient to protect them; and it is remarkable that such intense cold is always produced by a south wind. The day that our author took his draught, the wind blew faintly from the north.

Ætna.

Intense cold produced by a south wind.

The base of Mount Ætna, according to M. Houel's observations, consists of alternate layers of lava and marine substances, which have been deposited successively one upon another. These alternate layers extend to an unknown depth. They must needs go as far down as the level of the stratum of lava which was discharged by the volcano at its first origin. The last deposited by the sea is a range of calcareous mountains of a considerable height, and which are placed on a basis of lava. Beneath that layer of lava is another of sea pebbles, which are well known to be rounded by their attrition against one another by the motion of the waves. This layer is of considerable depth, and lies upon a yellowish rock consisting of a species of indurated sand. The river Simeto flows over this rock, which it has cut away considerably. That part which is at present the bed of the river is much higher than the base of Ætna that is on a level with the sea; and not the least thing occurs to suggest an idea of what has been the primary base of the volcano. The marine substances, already taken notice of, lie nearly in a horizontal direction, more or less so according to the nature of the surface on which they have been deposited.

Account of the strata at the foot of Mount Ætna.

Ætna abounds very much with springs, fountains, and even rivers of considerable magnitude. Our author has computed, that if all the water flowing down the sides of this mountain were collected, it would fill the channel of a river 36 feet broad and 6 in depth. Many of the springs afford fine salt; some are very pure, and others are impregnated with noxious substances; while others are remarkable for their use in dyeing particular colours.

Great number of springs on Mount Ætna.

“It is worthy of notice (says our author), that streams of water, some of them more copious, others more scanty, are seen to issue at all different degrees of height, from the base to the summit of the mountain. Even in summer, when very little rain falls for three or four months, or when perhaps for that space there is no rain at all, and for three of which, at least, there is not an ounce of snow melted; even then a great number of rivulets continue to flow down the sides of Ætna; and at the same time a number of streams, external and subterraneous, each of them several feet wide, are, according to the accounts of the country people, plentifully supplied with water.

Whence such a large quantity of water is derived.

“As the trifling quantity of snow which is melted here even in the midst of summer, and the still smaller quantity deposited by the clouds, would be totally insufficient to supply those streams, and must be all absorbed by the earth for the support of vegetation, those streams must proceed from some other cause, whose effects are more copious and permanent.

Fig. 1.



Fig. 2.



Produced by the internal evaporation of the mountain.

ment. This cause is the evaporation of those aqueous particles which arise from the constant ebullition at the bottom of the volcanic focus. These issuing out at the great crater, and at innumerable chinks in the sides of the mountain, are soon condensed by the cold of that elevated region of the atmosphere, and, percolating through the earth, give birth to those numerous streams in question.

“A volcano, according to my ideas, cannot subsist without water; nor can water occupy a place in any volcanic focus without being changed into vapour. But before that water can make its appearance, except in the form of smoke, it must have filled the whole volcanic cavern, and must have been forcibly pressed by the action of the fire against its sides: it must next have condensed, and assumed the form of water; in which state it must have penetrated through the inclined layers of sand and pozzolano which intervene betwixt the different strata of lava; for these strata lie one above another, and are full of chinks, in such a manner as to present to the eye an appearance pretty much resembling that of the inside of a tiled roof.”

Eruptions of Ætna more frequent anciently than now.

It has been a question, Whether the eruptions of Mount Ætna were more frequent in ancient than in modern times? At first it seems impossible to give a precise answer to such a question; but when we consider, that the matter in the volcanic focus was then greater in quantity than at present, in proportion to the space which it occupied; that the cavities were then sooner filled with vapour; and that the centre of the focus was then less remote, we will not hesitate to pronounce, that in earlier times the eruptions were more frequent as well as more copious.

Signs of an approaching eruption.

The first symptom of an approaching eruption is an increase of the smoke in fair weather: after some time, a puff of black smoke is frequently seen to shoot up in the midst of the white, to a considerable height. These puffs are attended with considerable explosions: for while Vesuvius was in this state, Sir William Hamilton went up to its top, which was covered with snow: and perceiving a little hillock of sulphur, about six feet high, which had been lately thrown up, and burnt with a blue flame on the top, he was examining this phenomenon, when suddenly a violent report was heard, a column of black smoke shot up with violence, and was followed by a reddish flame. Immediately a shower of stones fell; upon which he thought proper to retire. Phenomena of this kind, in all probability, precede the eruptions of Ætna in a much greater degree.—The smoke at length appears wholly black in the day-time, and in the night has the appearance of flame; showers of ashes are sent forth, earthquakes are produced, the mountain discharges volleys of red-hot stones to a great height in the air. The force by which these stones are projected, as well as their magnitude, seems to be in proportion to the bulk of the mountain. Signior Recuperò assured Mr Brydone, that he had seen immensely large ones thrown perpendicularly upwards to the height of 7000 feet, as he calculated from the time they took to arrive at the earth after beginning to descend from their greatest elevation. The largest stone, or rather rock, that was ever known to be emitted by Vesuvius, was 12 feet long and 45 in circumference. This was thrown a quarter of a mile; but much larger

ones have been thrown out by Mount Ætna, almost in the proportion in which the latter exceeds Vesuvius in bulk. Along with these terrible symptoms, the smoke that issues from the crater is sometimes in a highly electrified state. In this case, the small ashes which are continually emitted from the crater, are attracted by the smoke, and rise with it to a great height, forming a vast, black, and to appearance dense, column; from this column continual flashes of forked or zig-zag lightning issue, sometimes attended with thunder, and sometimes not, but equally powerful with ordinary lightning. This phenomenon was observed by Sir William Hamilton in the smoke of Vesuvius, and has also been taken notice of in that of Ætna; and where this electrified smoke hath spread over a track of land, much mischief hath been done by the lightning proceeding from it.

Ætna.

Thunder and lightning from the smoke.

When these dreadful appearances have continued sometimes four or five mouths, the *lava* begins to make its appearance. This is a stream of melted mineral matters, which in Vesuvius commonly boils over the top, but very seldom does so in Ætna; owing to the great weight of the lava, which long before it can be raised to the vast height of Mount Ætna, bursts out through some weak place in its side. Upon the appearance of the lava, the violent eruptions of the mountain generally, though not always, cease; for if this burning matter gets not sufficient vent, the commotions increase to a prodigious degree.—In the night-time the lava appears like a stream of fire, accompanied with flame; but in the day-time it has no such appearance: its progress is marked by a white smoke, which by the reflection of the red-hot matter in the night assumes the appearance of flame.

We shall close this article with an enumeration of all the different eruptions from Mount Ætna which are found upon record.

1. The first mentioned in history, is that of which Diodorus Siculus speaks, but without fixing the period at which it happened. That eruption, says he, obliged the Sicani, who then inhabited Sicily, to forsake the eastern, and retire to the southern, part of the island. A long time after that, the Sicilians, a people of Italy, migrated into Sicily, and took up their abode in that part of the island which had been left desert by the Sicani.

List of eruptions from the earliest period.

2. The second eruption known to have issued from this volcano, is the first of the three mentioned by Thucydides; of none of which he fixes the date, mentioning only in general, that from the arrival of the first Greek colonies that settled in Sicily (which was in the 11th Olympiad, and corresponds to the 734th year before the Christian æra), to the 88th Olympiad, or the year 425 before Christ, Ætna at three different times discharged torrents of fire. This second eruption happened, according to Eusebius, in the days of Phalaris, in the 565th year before the Christian æra. The assertion of Eusebius is confirmed by a letter from that tyrant to the citizens of Catania, and the answer of the Catanians (if, after Bentley's Dissertations against their authenticity, any credit be due to the Epistles of Phalaris). But Diodorus gives both these pieces.

3. The third, which is the second of the three mentioned by Thucydides, happened in the 65th Olympiad,

Ætna. piad, in the 477th year before the Christian æra, when Xantippus was archon at Athens. It was in this same year the Athenians gained their boasted victory over Xerxes's general Mardonius near Plataea. Both the eruption of the volcano and the victory of the Athenians are commemorated in an ancient inscription on a marble table which still remains. An ancient medal exhibits a representation of an astonishing deed to which that eruption gave occasion. Two heroic youths boldly ventured into the midst of the flames to save their parents. Their names, which well deserved to be transmitted to future ages, were Amphimomus and Anapius. The citizens of Catania rewarded no noble a deed with a temple and divine honours. Seneca, Silius Italicus, Valerius Maximus, and other ancient authors, mention the heroism of the youths with just applause.

4. The fourth eruption, the third and last of those mentioned by Thucydides, broke out in the 88th Olympiad, in the 425th year before the Christian æra. It laid waste the territory of Catania.

5. The fifth is mentioned by Julius Obsequens and Orofius, who date it in the consulship of Sergius Fulvius Flaccus and Quintus Calpurnius Piso, nearly 133 years before the Christian æra. It was considerable; but no peculiar facts are related concerning it.

6. In the consulship of Lucius Æmilius Lepidus and Lucius Aurelius Orestes, in the 125th year before the Christian æra, Sicily suffered by a violent earthquake. Such a deluge of fire streamed from Ætna as to render the adjoining sea into which it poured absolutely hot. Orofius says, that a prodigious quantity of fishes were destroyed by it. Julius Obsequens relates, that the inhabitants of the isles of Lipari ate such a number of those fishes, as to suffer, in consequence of it, by a distemper which proved very generally mortal.

7. Four years after the last mentioned, the city of Catania was desolated by another eruption, not less violent. Orofius relates, that the roofs of the houses were broken down by the burning ashes which fell upon them. It was so dreadfully ravaged, that the Romans found it necessary to grant the inhabitants an exemption from all taxes for the space of ten years, to enable them to repair it.

8. A short time before the death of Cæsar, in the 43d year before Jesus Christ, there was an eruption from Mount Ætna. Livy mentions it. It was not distinguished by any thing extraordinary. It was afterwards considered as an omen of the death of Cæsar.

9. Suetonius, in the life of Caligula, mentions an eruption from Mount Ætna which happened in the 40th year after the Christian æra. The emperor fled on the very night on which it happened, from Messina, where he at that time happened to be.

10. Carrera relates, that in the year 253, there was an eruption from Mount Ætna.

11. He speaks of another in the year 420; which is also mentioned by Photius.

12. In the reign of Charlemagne, in the year 812, there was an eruption from Ætna. Geoffroy of Viterbo mentions it in his Chronicle.

13. In the year 1169, on the 4th of February, about day-break, there was an earthquake in Sicily, which was felt as far as Reggio, on the opposite side of the Strait. Catania was reduced by it to ruins; and in

Ætna. that city more than 15,000 souls perished. The bishop, with 44 monks of the order of St Benedict, were buried under the ruins of the roof of the church of St Agatha. Many castles in the territories of Catania and Syracuse were overturned; new rivers burst forth, and ancient rivers disappeared. The ridge of the mountain was observed to sink in on the side next Taormino. The spring of Arethusa, so famous for the purity and sweetness of its waters, then became muddy and brackish. The fountain of Ajo, which rises from the village of Saraceni, ceased to flow for two hours; at the end of which the water gushed out more copiously than before. Its waters assumed a blood colour, and retained it for about an hour. At Messina, the sea without any considerable agitation, retired a good way within its ordinary limits; but soon after returning, it rose beyond them, advanced to the walls of the city, and entered the streets through the gates. A number of people who had fled to the shore for safety were swallowed up by the waves. Ludovico Aurelio relates, that the vines, corn, and trees of all sorts, were burnt up, and the fields covered over with such a quantity of stones as rendered them unfit for cultivation.

14. Twelve years after this, in the year 1181, a dreadful eruption issued from Ætna on the east side. Streams of fire ran down the declivity of the mountain, and encircled the church of St Stephen, but without burning it.

Nicolas Speciale, who relates, though he did not see, this event, was witness to another conflagration on Ætna 48 years after this, in the year 1329, on the 23d of June, of which he has given a description.

15. On that day, says he, about the hour of vespers, Ætna was strongly convulsed, and uttered dreadful noises; not only the inhabitants of the mountain, but all Sicily, were struck with consternation and alarm. On a sudden, a terrible blaze of fire issued from the southern summit, and spread over the rocks of Mazarra, which are always covered with snow. Together with the fire, there appeared a great deal of smoke. After sunset, the flames and the stones that issued out with them were seen to touch the clouds. The fire making way for itself with the most furious impetuosity, burnt up or reduced to ruins all those structures which the piety of former times had consecrated to the Deity. The earth yawning, swallowed up a great many springs and rivulets. Many of the rocks on the shore of Mafcall were shaken and dashed into the sea. A succession of these calamities continued till the 15th of July, when the bowels of Ætna were again heard to rebel. The conflagration of Mazarra still went on unextinguished. The earth opened near the church of St John, called *U' Pappir-necca*; on the fourth side fire issued from the gap with great violence: to add to the horrors of the day, the sun was obscured from morning to evening with clouds of smoke and ashes, as entirely as in an eclipse. Nicolas Speciale went towards the new-opened crater, to observe the fire and the burning stones which were issuing from the volcano. The earth rebelled and tottered under his feet; and he saw red hot stones issue four times successively in a very short space from the crater, with a thundering noise, the like of which, he says, he had never before heard.

Ætna. In a few days after this, all the adjacent fields were burnt up by a shower of fire and sulphureous ashes; and both birds and quadrupeds being thus left destitute of food, died in great numbers. A great quantity of fishes likewise died in the rivers and the contiguous parts of the sea. "I cannot think (says he) that either Babylon or Sodom was destroyed with such awful severity."—The north winds, which blew at the time, carried the ashes as far as Malta. Many persons of both sexes died of terror.

16. Scarce had four years elapsed after this terrible event, when Ætna made a new explosion, and discharged volleys of stones, causing the neighbouring fields to tremble. This happened in the year 1333.

17. Forty-eight years after this, on the 25th of August 1381, an eruption from Ætna spread its ravages over the confines of the territory of Catania, and burnt up the olive yards in the neighbourhood of that city.

18. In the year 1444, 63 years after the last eruption, a torrent of lava issued from Ætna and ran towards Catania. The mountain shook; and the shocks were so violent, that several huge masses of rock were broken from its summit, and hurled into the abyss with a tremendous noise.

19. After this Ætna was scarce at rest for 18 months or two years. On Sunday the 25th of September 1446, about an hour after sunset, an eruption issued from the place called *La Pietra di Mazarra*. This eruption was soon over.

20. On the following year, 1447, on the 21st of September, there was another, with a good deal of fire; but this eruption was likewise of short duration.

21. Ætna now ceased to emit fire, and that for a considerable time. The neighbouring inhabitants not only ascended to the summit of the mountain, but even, if we may credit accounts, went down into the fiery gulf, and believed the volcanic matter to be now exhausted: But on the 25th of April 1536, near a century from the slight eruption in 1447, a strong wind arose from the west, and a thick cloud, reddish in the middle, appeared over the summit of the mountain. At the very same instant a large body of fire issued from the abyss, and fell with the noise and rapidity of a torrent along the eastern side of the mountain, breaking down the rocks, and destroying the flocks and every other animal that was exposed to its fury. From the same crater, on the summit of the mountain, there issued at the same time a stream of fire more terrible than the other, and held its course towards the west. It ran over Broate, Adrans, and Castellì. It consisted entirely of sulphur and bitumen. On the same day the church of St Leon, which stood in a wood, was first demolished by the shocks of the earthquake, and its ruins after that consumed by the fire. Many chafins were opened in the sides of the mountain; and from those issued fire and burning stones, which darted up into the air with a noise like that produced by a smart discharge of artillery. Francis Negro de Piazza, a celebrated physician, who lived at Lentini, wishing to have a nearer view of the eruptions, and to make some observations which he thought might be of consequence, was carried off and burnt to ashes by a volley

of the burning stones. This conflagration of Ætna lasted some weeks. Ætna.

22. In less than a year, on the 17th of April 1537, the river Simeto swelled so amazingly as to overflow the adjacent plains, and carry off the country people and their cattle and other animals. At the same time, the country around Paterno, the neighbouring castles, and more than 500 houses, were destroyed by the ravages of the river; and most of the wood was torn up by the roots by violent blasts of wind. These ravages of the elements were occasioned by Ætna, which on the 11th of the following month was rent in several places, disclosing fiery gulfs, and pouring out a deluge of fire in more terrible torrents than those of the preceding year. They directed their course towards the monastery of St Nicholas d'Arena; destroyed the gardens and vineyards; and proceeding onwards towards Nicolosi, burnt Montpelleri and Fallica, and destroyed the vineyards and most of the inhabitants. When the conflagration ceased, the summit of the mountain sunk inwards with such a noise, that all the people in the island believed the last day to be arrived, and prepared for their end by extremeunction. These dreadful disturbances continued through the whole year, more especially in the months of July and August, during which all Sicily was in mourning. The smoke, the noise, and the shocks of the earthquake, affected the whole island; and if Filotes may be believed, who relates this event, many of the Sicilians were struck deaf by the noise. Many structures were demolished; and among others the castle of Corleone, though more than 25 leagues distant from the volcano.

23. During the succeeding 30 years there was no disturbance of this nature. At the end of that space, Sicily was alarmed by a new eruption from the mountain. Ætna discharged new streams of fire, and covered the adjacent country with volcanic ashes, which entirely ruined the hopes of the husbandman.

24. In the year 1579, Ætna renewed its ravages; but no particular account of the damage which it did upon this occasion has been transmitted to us.

25. Twenty-five years had elapsed, when Ætna, in the month of June 1603, flamed with new fury. Peter Carrera affirms, that it continued to emit flames for the space of 33 years, till 1636, without interruption, but not always with the same violence. In 1607, the streams of lava which flowed from it destroyed the woods and vineyards on the west side of the mountain. In 1609, they turned their course towards Aderno, and destroyed a part of the forest del Pino, and a part of the wood called *la Sciambrita*, with many vineyards in the district Costerna. These torrents of lava continued to flow for three months. In the year 1614, a new effort of the subterraneous fire opened another crater, from which fire was discharged on Randazzo, in the district called *il Piro*. The fire continued to flame for 10 or 12 years longer.

26. The same Peter Carrera relates, that a dreadful conflagration happened in the year 1664, of which he himself was witness. It happened on the 13th of December, and lasted without interruption, but with different degrees of violence, till the end of May 1678. But in 1669 the inhabitants of Nicolosi were obliged

Ætna. to forsake their houses, which tumbled down soon after they left them. The crater on the summit of Ætna had not at this time a threatening aspect, and every thing there continued quiet till the 25th of March: but on the 8th of that month, an hour before night, the air was observed to become dark over the village la Pedara and all that neighbourhood; and the inhabitants of that country thought that an almost total eclipse was taking place. Soon after sunset, frequent shocks of earthquakes began to be felt; these were at first weak, but continued till day-break to become more and more terrible. Nicolosi was more affected than any other tract of country on that side of Ætna; about noon every house was thrown to the ground; the inhabitants fled in consternation, and invoking the protection of heaven. On the 10th of March a chasm several miles in length, and five or six feet wide, opened in the side of the mountain; from which, about two hours before day, there arose a bright light, and a very strong sulphureous exhalation was diffused through the atmosphere.

About 11 in the forenoon of the same day, after dreadful shocks of earthquake, a crater was opened on the hill called *des Noisettes*, from which there issued huge volumes of smoke, not accompanied with fire, ashes, or stones, but with loud and frequent claps of thunder, displaying all the different phenomena with which thunder is at different times attended. And what was very remarkable, the chasm was formed on the south side, between the top and the bottom of the mountain. On the same day another chasm was formed two miles lower, from which issued a great deal of smoke, accompanied with a dreadful noise and earthquake. Towards the evening of the same day, four other chasms were opened towards the south, in the same direction, accompanied during their formation with the same phenomena, and extending all the way to the hill called *la Pufara*.

About 12 paces beyond that, another of the same kind was formed. On the succeeding night, a black smoke, involving a quantity of stones, issued from this last chasm; it discharged at the same time flakes of a dark earth-coloured spongy matter, which became hard after they fell. There issued from the same gulf a stream of lava, which held its course into a lake called *la Hardia*, six miles from Montpellier, and on its way thither destroyed many dwelling-houses and other buildings in the neighbouring villages.

On the next day, March 12th, this stream of fire directed its course towards the tract of country called *Malpasso*, which was inhabited by 800 people: in the space of 20 hours it was entirely depopulated and laid waste. The lava then took a new direction, in which it destroyed some other villages.

The mount of Montpellier was next destroyed with all the inhabitants upon it.

On the 23d of the same month the stream of fire was in some places two miles broad. It now attacked the large village of Mazzalucia; and on the same day a vast gulf was formed, from which were discharged sand or ashes, which produced a hill with two summits, two miles in circumference and 150 paces high. It was observed to consist of yellow, white, black, gray, red, and green stones.

The new mount of Nicolosi continued to emit ashes

for the space of three months; and the quantity discharged was so great as to cover all the adjoining tract of country for the space of 15 miles: some of these ashes were conveyed by the winds as far as Messina and Calabria; and a north wind arising, covered all the southern country about Agosta, Lentini, and even beyond that, in the same manner.

While at that height on Nicolosi so many extraordinary appearances were passing, the highest crater on the summit of Ætna still preserved its usual tranquillity.

On the 25th of March, about one in the morning, the whole mountain, even to the most elevated peak, was agitated by a most violent earthquake. The highest crater of Ætna, which was one of the loftiest parts of the mountain, then sunk into the volcanic focus; and in the place which it had occupied, there now appeared nothing but a wide gulf more than a mile in extent, from which there issued enormous masses of smoke, ashes, and stones. At that period, according to the historian of this event, the famous block of lava on Mount Frumento was discharged from the volcanic focus.

In a short time after, the torrent of fire, which still continued to flow, directed its course towards Catania with redoubled noise, and accompanied with a much greater quantity of ashes and burning stones than before. For several months many most alarming shocks of earthquakes were felt; and the city was threatened with destruction by the torrent of fire. In vain they attempted to turn or divert its course; the lava rose over the walls, and entered by an angle near the Benedictine convent on the 11th of June following. This awful event is related by Francis Monaco, Charles Mancius, Vincent Auria, and Thomas Thedeschi.

A description of the lava issuing from Mount Ætna Lord Winchelsea's account of the eruption in 1669. Sir W. Hamilton gives the following extract of it. "When it was night, I went upon two towers in divers places; and I could plainly see, at ten miles distance, as we judged, the fire begin to run from the mountain in a direct line, the flame to ascend as high and as big as one of the greatest steeples in your Majesty's kingdoms, and to throw up great stones into the air; I could discern the river of fire to descend the mountain of a terrible fiery or red colour, and stones of a paler red to swim thereon, and to be some as big as an ordinary table. We could see this fire to move in several other places, and all the country covered with fire, ascending with great flames in many places, smoking like to a violent furnace of iron melted, making a noise with the great pieces that fell, especially those that fell into the sea. A cavalier of Malta, who lives there, and attended me, told me, that the river was as liquid, where it issues out of the mountain, as water, and came out like a torrent with great violence, and is five or six fathom deep, and as broad, and that no stones sink therein."

The account given in the Philosophical Transactions is to the same purpose. We are there told, that the lava is "nothing else than diverse kinds of metals and minerals, rendered liquid by the fierceness of the fire in the bowels of the earth, boiling up and gushing forth

Ætna. forth as the water doth at the head of some great river; and having run in a full body for a stone's cast or more, began to crack or curdle, becoming, when cold, those hard porous stones which the people call *sciatri*. These, though cold in comparison of what first issues from the mountain, yet retained so much heat as to resemble huge cakes of sea-coal strongly ignited, and came tumbling over one another, bearing down or burning whatever was in their way.—In this manner the lava proceeded slowly on till it came to the sea, when a most extraordinary conflict ensued betwixt the two adverse elements. The noise was vastly more dreadful than the loudest thunder, being heard through the whole country to an immense distance; the water seemed to retire and diminish before the lava, while clouds of vapour darkened the sun. The whole fish on the coast were destroyed, the colour of the sea itself was changed, and the transparency of its waters lost for many months.

While this lava was issuing in such prodigious quantity, the merchants, whose account is recorded in the Philosophical Transactions, attempted to go up to the mouth itself; but durst not come nearer than a furlong, lest they should have been overwhelmed by a vast pillar of ashes, which to their apprehension exceeded twice the bigness of St Paul's steeple in London, and went up into the air to a far greater height; at the mouth itself was a continual noise, like the beating of great waves of the sea against rocks, or like distant thunder, which sometimes was so violent as to be heard 60, or even 100 miles off; to which distance also part of the ashes was carried. Some time after, having gone up, they found the mouth from whence this terrible deluge issued to be only a hole about 10 feet diameter. This is also confirmed by Mr Brydone; and is probably the same through which Sir William Hamilton descended into the subterranean caverns already mentioned.

27. Some years after this conflagration, a new burning gulf opened in the month of December 1682 on the summit of the mountain, and spread its lava over the hill of Mazarra.

28. On the 24th of May 1686, about ten in the evening, a new eruption burst out from the summit of the mountain, on the side contiguous to the hill del Bue. Such a quantity of inflamed matter was thrown out as consumed woods, vineyards, and crops of grain, for four leagues round. It stopped its course in a large valley near the castle of Mascali. Several people from the neighbourhood had ascended a hill between the wood of Catania and the confines of Cirrita to observe the progress of the lava: but the hill, on a sudden, sunk inwards, and they were buried alive.

29. Ætna was now long quiet; for no less a space of time indeed than one half of the present age. In the year 1755 its eruptions were renewed. It opened near Mount Lepira, and emitted as usual fire and smoke; after which it remained quiet only for eight years.

30. In the year 1763, there was an eruption which continued three months, but with intervals. Ætna was at first heard to rebel. Flames and clouds of smoke were seen to issue out, sometimes silver-coloured, and at other times, when the rays of the sun fell upon them, of a purple radiance: at length they were carried off by the winds, and rained, as they were

driven before them, a shower of fire all the way to Catania and beyond it. An eruption soon burst out; the principal torrent divided into two branches, one of which ran towards the east, and fell into a deep and extensive valley.

The flames which issued from this new crater afforded a noble spectacle. A pyramid of fire was seen to rise to a prodigious height in the air, like a beautiful artificial fire-work, with a constant and formidable battery, which shook the earth under those who were spectators of the scene. Torrents of melted matter running down the sides of the mountain, diffused a light bright as day through the darkness of night.

At sun-rising the burning lava was observed to have run round some oaks that were still standing unburnt. Their leaves were all withered. Some birds had fallen from their branches, and been burnt to death. Some people cast wood upon the lava, and it was immediately burnt. This lava continued hot, and exhaled smoke for two years. For five years after this, no snow appeared on the summit of Ætna.

31. In the year 1764 a new crater was opened at a great distance from Mount Ætna.

32. In the year 1766 another was opened at the grotto of Paterno: fire, smoke, and an inconsiderable torrent of lava issued out of it.

33. On the 27th of January 1780 a new opening was formed two miles under the last-mentioned crater. On the 28th of February, and the 14th of March, the earthquake was renewed on the north side, and accompanied with terrible noises.

Between the 6th of April and the 7th of May the convulsions were again renewed, accompanied with noise as before; a quantity of pumice stones and fine sand was discharged from it.

On the 18th of May the shocks were renewed: on the 23d a new crater was formed on the side of Mount Frumento on the summit of Ætna: and from it a torrent of lava discharged, which spread through the valley of Laudunza. It was 200 paces in breadth. Two other chinks were opened in the mountain near Paterno, and very near one another. The lava issuing from them proceeded, in the space of seven days, six miles; on the 25th it had run nine miles.

A new crater was likewise opened on the 25th; from which a quantity of red-hot stones continued to issue for half an hour, and fell at a very great distance: there proceeded likewise from it a stream of lava; which, in the same space of time, ran over a tract of country two miles in extent.

Several parts of those streams of lava were observed to be cool on the surface, and formed into solid masses, but melted again by a new stream of burning lava, which however did not melt the old lava.

34. The last eruption happened in 1787. From the 1st to the 10th of July, there were signs of its approach. On the 11th, after a little calm, there was a subterraneous noise, like the sound of a drum in a close place, and it was followed by a copious burst of black smoke. It was then calm till the 15th, when the same prognostics recurred. On the 17th, the subterraneous noise was heard again: the smoke was more abundant, slight shocks of an earthquake followed, and the lava flowed from behind one of the two little mountains which form

Account of
the late
eruption,
1787.

Ætna. the double head of Ætna. On the 18th, while the spectators were in anxious expectation of a more severe eruption, all was quiet, and continued so more than 12 hours: soon after they perceived some new shocks, accompanied with much noise; and the mountain threw out a thick smoke, which, as the wind was westerly, soon darkened the eastern horizon: two hours afterwards a shower of fine black brilliant sand descended: on the east side it was a storm of stones; and, at the foot of the mountain, a deluge of flashes of fire, of scoria and lava.

These appearances continued the whole day; at the setting of the sun the scene changed. A number of conical flames rose from the volcano; one on the north, another on the south, were very conspicuous, and rose and fell alternately. At three in the morning, the mountain appeared cleft, and the summit seemed a burning mass. The cones of light which arose from the crater were of an immense extent, particularly the two just mentioned. The two heads seemed to be cut away: and at their separation was a cone of flame, seemingly composed of many lesser cones. The flame seemed of the height of the mountain placed on the mountain; so that it was probably two miles high, on a base of a mile and a half in diameter. This cone was still covered with a very thick smoke, in which there appeared very brilliant flashes of lightning, a phenomenon which Ætna had not before afforded. At times, sounds like those from the explosion of a large cannon were heard seemingly at a less distance than the mountain. From the cone, as from a fountain, a jet of many flaming volcanic matters was thrown, which were carried to the distance of six or seven miles: from the base of the cone a thick smoke arose, which, for a moment, obscured some parts of the flame, at the time when the rivers of lava broke out. This beautiful appearance continued three quarters of an hour. It began the next night with more force; but continued only half an hour. In the intervals, however, Ætna continued to throw out flames, smoke, ignited stones, and showers of sand. From the 20th to the 22d, the appearances gradually ceased. The stream of lava was carried towards Bronte and the plain of Lago.

After the eruption, the top of the mountain on the western side was found covered with hardened lava, scoria, and stones. The travellers were annoyed by smoke, by showers of sand, mephitic vapours, and excessive heat. They saw that the lava which came from the western point divided into two branches, one of which was directed towards Libeccio; the other, as we have already said, towards the plain of Lago. The lava on the western head of the mountain, had from its various shapes been evidently in a state of fusion; from one of the spiracula, the odour was strongly that of liver of sulphur. The thermometer, in descending, was at 40 degrees of Fahrenheit's scale; while near the lava, in the plain of Lago, it was 140 degrees. The lava extended two miles; its width was from $13\frac{1}{4}$ to 21 feet, and its depth $13\frac{1}{4}$ feet.

These are the most remarkable circumstances we have been able to collect, that might serve to give an adequate idea of this famous mountain. Many things, however, concerning the extent, antiquity, &c. of the lavas, remain to be discussed, as well as the opinions of philosophers concerning the origin of the internal fire

which produces so much mischief: but the consideration of these belongs to the general article VOLCANO, to which the reader is referred.

ÆTNA salt, *Sal Ætnæ*, a name given by some authors to the sal ammoniac which is found on the surface and sides of the openings of Ætna, and other burning mountains, after their eruptions; and sometimes on the surface of the ferruginous matter which they throw out. This salt makes a very various appearance in many cases: it is sometimes found in large and thick cakes; sometimes only in form of a thin powder, scattered over the surface of the earth and stones. Some of this salt is yellow, some white, and some greenish.

ÆTOLARCHA, in *Grecian Antiquity*, the principal magistrate or governor of the Ætolians.

ÆTOLIA, a country of ancient Greece, comprehending all that tract now called the *Despotat*, or *Little Greece*. It was parted on the east by the river Evenus, now the Fidari, from the Locrenses Ozolæ; on the west, from Acarnania, by the Achelous; on the north, it bordered on the country of the Dorians and part of Epirus; and, on the south, extended to the bay of Corinth.

The Ætolians were a restless and turbulent people; seldom at peace among themselves, and ever at war with their neighbours; utter strangers to all sense of friendship or principles of honour; ready to betray their friends upon the least prospect of reaping any advantage from their treachery: in short, they were looked upon by the other states of Greece no otherwise than as outlaws and public robbers. On the other hand, they were bold and enterprising in war; inured to labour and hardships; undaunted in the greatest dangers; jealous defenders of their liberties, for which they were, on all occasions, willing to venture their lives, and sacrifice all that was most dear to them. They distinguished themselves above all the other nations of Greece, in opposing the ambitious designs of the Macedonian princes; who, after having reduced most of the other states, were forced to grant them a peace upon very honourable terms. The constitution of the Ætolian republic was copied from that of the Achæans, and with a view to form, as it were, a counter alliance; for the Ætolians bore an irreconcilable hatred to the Achæans, and had conceived no small jealousy at the growing power of that state. The Cleomenic war, and that of the allies, called the *social war*, were kindled by the Ætolians in the heart of Peloponnesus, with no other view but to humble their antagonists the Achæans. In the latter, they held out, with the assistance only of the Eleans and Lacedæmonians for the space of three years, against the united forces of Achæa and Macedon; but were obliged at last to purchase a peace, by yielding up to Philip all Acarnania. As they parted with this province much against their will, they watched all opportunities of wresting it again out of the Macedonian's hands; for which reason they entered into an alliance with Rome against him, and proved of great service to the Romans in their war with him: but growing insolent upon account of their services, they made war upon the Romans themselves. By that warlike nation they were overcome, and granted a peace on the following severe terms; 1. The majesty of the Roman people

Ætolia. people shall be revered in all Ætolia. 2. Ætolia shall not suffer the armies of such as are at war with Rome to pass through her territories, and the enemies of Rome shall be likewise the enemies of Ætolia. 3. She shall, in the space of 100 days, put into the hands of the magistrates of Corcyra all the prisoners and deserters she has, whether of the Romans or their allies, except such as have been taken twice, or during her alliance with Rome. 4. The Ætolians shall pay down in ready money, to the Roman general in Ætolia, 200 Euboic talents, of the same value as the Athenian talents, and engage to pay 50 talents more within the six years following. 5. They shall put into the hands of the consul 40 such hostages as he shall choose; none of whom shall be under 12, or above 40 years of age: the prætor, the general of the horse, and such as have been already hostages at Rome, are excepted out of this number. 6. Ætolia shall renounce all pretensions to the cities and territories which the Romans have conquered, though these cities and territories had formerly belonged to the Ætolians. 7. The city of Ocnis, and its district, shall be subject to the Acarnanians.

After the conquest of Macedonia by Æmilius Paulus, they were reduced to a much worse condition; for not only those among them who had openly declared for Perseus, but such as were only suspected to have favoured him in their hearts, were sent to Rome, in order to clear themselves before the senate. There they were detained, and never afterwards suffered to return into their native country. Five hundred and fifty of the chief men of the nation were barbarously assassinated by the partisans of Rome, for no other crime but that of being suspected to wish well to Perseus. The Ætolians appeared before Æmilius Paulus in mourning habits, and made loud complaints of such inhuman treatment; but could obtain no redress: nay, ten commissioners, who had been sent by the senate to settle the affairs of Greece, enacted a decree, declaring, that those who were killed had suffered justly, since it appeared to them that they had favoured the Macedonian party. From this time those only were raised to the chief honours and employments in the Ætolian republic who were known to prefer the interest of Rome to that of their country; and as these alone were countenanced at Rome, all the magistrates of Ætolia were the creatures and mere tools of the Roman senate. In this state of servile subjection they continued till the destruction of Corinth, and the dissolution of the Achæan league; when Ætolia, with the other free states of Greece, was reduced to a Roman province, commonly called the *province of Achaia*. Nevertheless, each state and city was governed by its own laws, under the superintendency of the prætor whom Rome sent annually into Achaia. The whole nation paid a certain tribute, and the rich were forbidden to possess lands anywhere but in their own country.

In this state, with little alteration, Ætolia continued under the emperors, till the reign of Constantine the Great, who, in his new partition of the provinces of the empire, divided the western parts of Greece from the rest, calling them *New Epirus*, and subjecting the whole country to the *præfectus prætorii* for Illyricum. Under the successors of Constantine, Greece was parcelled out into several principalities, especially after

the taking of Constantinople by the Western princes. At that time, Theodorus Angelus, a noble Grecian, of the imperial family, seized on Ætolia and Epirus. The former he left to Michael his son; who maintained it against Michael Palæologus, the first emperor of the Greeks, after the expulsion of the Latins. Charles, the last prince of this family, dying in 1430 without lawful issue, bequeathed Ætolia to his brother's son, named also *Charles*; and Acarnania to his natural sons, Memnon, Turnus, and Hercules. But, great disputes arising about this division, Amurath II. after the reduction of Thessalonica, laid hold of it favourable an opportunity, and drove them all out in 1432. The Mahometans were afterwards dispossessed of this country by the famous prince of Epirus, George Castriot, commonly called *Scanderbeg*; who, with a small army, opposed the whole power of the Ottoman empire, and defeated these barbarians in 22 pitched battles. That hero, at his death, left great part of Ætolia to the Venetians; but, they not being able to make head against such a mighty power, the whole country was soon reduced by Mohammed II. whose successors hold it to this day.

AFER, DOMITIUS, a famous orator, born at Nismes, flourished under Tiberius and the three succeeding emperors. Quintilian makes frequent mention of him, and commends his pleadings. But he disgraced his talents, by turning informer against some of the most distinguished personages in Rome. Quintilian, in his youth, cultivated the friendship of Domitius very assiduously. He tells us that his pleadings abounded with pleasant stories, and that there were public collections of his witty sayings, some of which he quotes. He also mentions two books of his "*On Witnesses*." Domitius was once in great danger from an inscription he put upon a statue erected by him in honour of Caligula, wherein he declared that this prince was a second time consul at the age of 27. This he intended as an encomium, but Caligula taking it as a sarcasm upon his youth, and his infringement of the laws, raised a process against him, and pleaded himself in person. Domitius, instead of making a defence, repeated part of the emperor's speech with the highest marks of admiration; after which he fell upon his knees, and, begging pardon, declared, that he dreaded more the eloquence of Caligula than his imperial power. This piece of flattery succeeded so well, that the emperor not only pardoned, but also raised him to the consulship. Afer died in the reign of Nero, A. D. 59.

AFFA, a weight used on the Gold Coast of Guinea. It is equal to an ounce, and the half of it is called *eggeba*. Most of the blacks on the Gold Coast give these names to those weights.

AFFECTION, in a general sense, implies an attribute inseparable from its subject. Thus magnitude, figure, weight, &c. are affections of all bodies; and love, fear, hatred, &c. are affections of the mind.

AFFECTION, signifying a *settled bent of mind toward a particular being or thing*, occupies a middle space between *disposition* on the one hand, and *passion* on the other*. It is distinguishable from *Disposition*, which being a branch of one's nature, originally, must exist before there can be an opportunity to exert it upon any particular object; whereas *Affection* can never be original,

Afer
||
Affection.

Afferers

Affinity.

ginal, because, having a special relation to a particular object, it cannot exist till the object have once at least been presented. It is also distinguishable from Passion, which, depending on the real or ideal presence of its object, vanishes with it: whereas Affection is a lasting connection; and, like other connections, subsists even when we do not think of the person. A familiar example will illustrate this. There may be in one person's mind a disposition to gratitude, which, through want of an object, happens never to be exerted; and which therefore is never discovered even by the person himself. Another, who has the same disposition, meets with a kindly office that makes him grateful to his benefactor: An intimate connection is formed between them, termed *affection*; which, like other connections, has a permanent existence, though not always in view. The affection, for the most part, lies dormant, till an opportunity offer for exerting it: in that circumstance, it is converted into the passion of gratitude; and the opportunity is eagerly seized of testifying gratitude in the warmest manner.

AFFECTION, among *Physicians*, signifies the same as disease. Thus the hysteric *affection* is the same with the hysteric disease.

AFFERERS, or *AFFERORS*, in *Law*, persons appointed in courts-leet, courts-baron, &c. to settle, upon oath, the fines to be imposed upon those who have been guilty of faults arbitrarily punishable.

AFFETTUOSO, or *Con AFFETTO*, in the *Italian Music*, intimates that the part to which it is added ought to be played in a tender moving way, and consequently rather slow than fast.

AFFIANCE, in *Law*, denotes the mutual plighting of troth between a man and woman to marry each other.

AFFIDAVIT, signifies an oath in writing, sworn before some person who is authorized to take the same.

AFFINITY, among *Civilians*, implies a relation contracted by marriage; in contradistinction to consanguinity, or relation by blood.—Affinity does not found any real kinship; it is no more than a kind of fiction, introduced on account of the close relation between husband and wife. It is even said to cease when the cause of it ceases: hence a woman who is not capable of being a witness for her husband's brother during his lifetime, is allowed for a witness when a widow, by reason the affinity is dissolved. Yet with regard to the contracting marriage, affinity is not dissolved by death, though it be in every thing else.

There are several degrees of affinity, wherein marriage was prohibited by the law of Moses: thus, the son could not marry his mother, nor his father's wife (Lev. xviii. 7. et seq.): the brother could not marry his sister, whether she were so by the father only or by the mother only, and much less if she was his sister both by the same father and mother: the grandfather could not marry his grand-daughter, either by his son or daughter. No one could marry the daughter of his father's wife, nor the sister of his father or mother; nor the uncle his niece; nor the aunt her nephew; nor the nephew the wife of his uncle by the father's side. The father-in-law could not marry his daughter-in-law: nor the brother the wife of his brother, while living; nor even after the death of his brother, if he left children. If he left no children, the surviv-

ing brother was to raise up children to his deceased brother, by marrying his widow. It was forbidden to marry the mother and the daughter at one time, or the daughter of the mother's son, or the daughter of her daughter, or two sisters together. It is true the patriarchs before the law married their sisters, as Abraham married Sarah, who was his father's daughter by another mother; and two sisters together, as Jacob married Rachel and Leah; and their own sisters by both father and mother, as Seth and Cain. But these cases are not to be proposed as examples: because in some they were authorized by necessity, in others by custom; and the law as yet was not in being. If some other examples may be found, either before or since the law, the Scripture expressly disapproves of them, as Reuben's incest with Bilhah his father's concubine, and the action of Amnon with his sister Tamar; and that of Herod-Antipas, who married Herodias his sister-in-law, his brother Philip's wife, while her husband was yet living.

AFFINITY is also used to denote conformity or agreement: Thus we say, the *affinity* of languages, the *affinity* of words, the *affinity* of sounds, &c.

AFFINITY, in *Chemistry*, is a term employed to express that peculiar propensity which the particles of matter have to unite and combine with each other exclusively, or in preference to any other connection.

The attractions between bodies at insensible distances, and which of course are confined to the particles of matter, have been distinguished by the name of *affinity*, while the term *attraction* has been more commonly confined to cases of sensible distance. And as the particles of matter are of two kinds, either *homogeneous* or *heterogeneous*, so there are two kinds of affinity.

“Homogeneous affinity urges the homogeneous particles towards each other, and keeps them at insensible distances from each other; and consequently is the cause why bodies almost always exist united together, so as to constitute masses of sensible magnitude. This affinity is usually denoted by the term *cohesion*, and sometimes by *adhesion* when the surfaces of bodies are only referred to. Homogeneous affinity is nearly universal; as far as is known, caloric and light only are destitute of it.

Heterogeneous affinity urges heterogeneous particles towards each other, and keeps them at insensible distances from each other, and of course is the cause of the formation of new integrant particles composed of a certain number of heterogeneous particles. These new integrant particles afterwards unite by cohesion, and form masses of compound bodies. Thus an integrant particle of water is composed of particles of hydrogen and oxygen, urged towards each other, and kept at an insensible distance by heterogeneous affinity; and a mass of water is composed of an indefinite number of integrant particles of that fluid, urged towards each other by homogeneous affinity. Heterogeneous affinity is universal, as far as is known; that is to say, there is no body whose particles are not attracted by the particles of some other body; but whether the particles of all bodies have an affinity for the particles of all other bodies, is a point which we have no means of ascertaining. It is, however, exceedingly probable, and has been generally taken for granted; though it

Affinity.

Affirmation is certainly affirming more than even analogy can warrant." (*Thomson's Chemistry*.)

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Afforage.

AFFIRMATION, in *Logic*, the asserting the truth of any proposition.

AFFIRMATION, in *Law*, denotes an indulgence allowed to the people called *Quakers*: who, in cases where an oath is required from others, may make a solemn affirmation that what they say is true; and if they make a false affirmation, they are subject to the penalties of perjury. But this relates only to oaths taken to the government, and on civil occasions; for *Quakers* are not permitted to give their testimony in any criminal case, &c.

AFFIRMATION is also used for the ratifying or confirming the sentence or decree of some inferior court: Thus we say, the house of lords affirmed the decree of the chancellor, or the decree of the lords of session.

AFFIRMATIVE, in *Grammar*. Authors distinguish affirmative particles; such as, *yes*.—The term *affirmative* is sometimes also used substantively. Thus we say, the affirmative is the more probable side of the question: there were so many votes, or voices, for the affirmative.

AFFIX, in *Grammar*, a particle added at the close of a word, either to diversify its form or alter its signification. We meet with *affixes* in the Saxon, the German, and other northern languages; but more especially in the Hebrew, and other oriental tongues. The Hebrew *affixes* are single syllables, frequently single letters, subjoined to nouns and verbs; and contribute not a little to the brevity of that language. The oriental languages are much the same as to the *radicals*, and differ chiefly from each other as to *affixes* and *prefixes*.

AFFLATUS, literally denotes a blast of wind, breath, or vapour, striking with force against another body. The word is Latin, formed from *ad* "to," and *flare* "to blow." Naturalists sometimes speak of the afflatus of serpents. Tully uses the word figuratively, for a divine inspiration; in which sense, he ascribes all great and eminent accomplishments to a divine afflatus. The Pythian priestess being placed on a tripod or perforated stool, over a holy cave, received the divine afflatus, as a late author expresses it, in her belly; and being thus inspired, fell into agitations, like a phrenetic; during which she pronounced, in hollow groans and broken sentences, the will of the deity. This afflatus is supposed, by some, to have been a subterraneous fume, or exhalation, wherewith the priestess was literally inspired. Accordingly, it had the effects of a real physical disease; the paroxysm of which was so vehement, that Plutarch observes it sometimes proved mortal. Van Dale supposes the pretended enthusiasm of the Pythia, to have arisen from the fumes of aromatics.

AFFLICTION is not itself, in propriety of medical speech, a disease, but it is the cause of many: for whatever excites envy, anger, or hatred, produces diseases from tense fibres; as whatever excites fear, grief, joy, or delight, begets diseases from relaxation.

AFFORAGE, in the French customs, a duty paid to the lord of a district, for permission to sell wine, or other liquors, within his seigniority. Afforage is also used for the rate or price of provisions laid and fixed by the provost or sheriffs of Paris.

AFFORESTING, AFFORESTATIO, the turning ^{Afforesting} ground into forest. The Conqueror, and his successors, continued afforesting the lands of the subject for many reigns; till the grievance became so notorious, that the people of all degrees and denominations were brought to sue for relief; which was at length obtained, and commissions were granted to survey and perambulate the forest, and separate all the new afforested lands, and reconvert them to the uses of their proprietors, under the name and quality of *purlieu* or *pouralle land*.

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Afhghans.

AFFRAY, or AFFRAYMENT, in *Law*, formerly signified the crime of affrighting other persons, by appearing in unusual armour, brandishing a weapon, &c. but at present, *affray* denotes a skirmish or fight between two or more.

AFFRONTÉE, in *Heraldry*, an appellation given to animals facing one another on an escutcheon; a kind of bearing which is otherwise called *confrontée*, and stands opposed to *adoffée*.

AFFUSION, the act of pouring some fluid substance on another body. Dr Grew gives several experiments of the luctation arising from the affusion of divers menstruums on all sorts of bodies. Divines and church historians speak of baptism by affusion; which amounts to much the same with what we now call *sprinkling*.

AFGHANS, in *History*, a people who inhabit a province of CABUL or CABULISTAN, in the northern parts of India. They boast of being descended of Saul the first king of Israel, and that their great ancestor was raised from the rank of a shepherd, not on account of his princely qualities, but because his stature was exactly equal to the length of a rod which the angel Gabriel had given to the prophet Samuel as the measure of the stature of him whom God had destined to fill the throne of Israel.

Saul, whose descent, according to some of them, was of Judah, and according to others of Benjamin, had, they say, two sons, Berkia and Irmia, who served David, and were beloved by him. The sons of Berkia and Irmia were Afghan and Usbec, who, during the reigns of David and Solomon, distinguished themselves, the one for strength of body, and the other for learning. The strength of Afghan, we are told, struck terror even into the demons and genii.

This hero used frequently to make excursions to the mountains, where his progeny, after his death, formed establishments, lived in a state of independence, fortified themselves, and exterminated infidels. When Mahomet appeared upon earth, his fame reached the Afghans, who fought him in multitudes under their leaders Khalid and Abdul Respid, sons of Walid; and the prophet honouring them with this reception—"Come, O *Muluc*, or Kings!" they assumed the title of *Muluc*, which they retain to this day.

The Afghans are sometimes called *Solaimani*, either because they were formerly the subjects of Solomon king of Israel, or because they inhabit the mountains of Solomon. They are likewise called Patans, a name derived from the Hindû verb *paitna* "to rush," which was given to them by a sultan, in consequence of the alacrity with which they had attacked and conquered his enemies. The province which they occupy at present was formerly called Roh; and hence is derived the

name

Afghans
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Africa.

name of the Rohillas. The city which was established in it by the Afghans was called by them Paishwer or Paisher, and is now the name of the whole district. The sects of the Afghans are very numerous, and they are Mussulmans, partly of the Sunni, and partly of the Schiek persuasion.

They are divided into four classes. The first is the pure class, consisting of those whose fathers and mothers were Afghans. The second class consists of those whose fathers were Afghans and mothers of another nation. The third class contains those whose mothers were Afghans and fathers of another nation. The fourth class is composed of the children of women whose mothers were Afghans and fathers and husbands of a different nation. Persons who do not belong to one of these classes are not called Afghans.

This people have at all times distinguished themselves by their courage. They have conquered for their own princes and for foreigners, and have always been considered as the strength and support of the army in which they served. As they have been applauded for virtues, they have also been reproached for vices, having sometimes been guilty of treachery, and of acting the base part even of assassins.

Sir William Jones seems to have had no doubt but the Afghans are descendants of Israel. "We learn (says he) from Esdras, that the ten tribes, after a wandering journey, came to a country called Arfareth, where we may suppose they settled: now the Afghans are said by the best Persian historians to be descended from the Jews. They have traditions among themselves of such a descent; and it is even asserted, that their families are distinguished by the names of Jewish tribes, although, since their conversion to Islam, they studiously conceal their origin from all whom they admit not to their secrets. The Pushto language, of which I have seen a dictionary, has a manifest resemblance to the Chaldaic; and a considerable district under their dominion is called Hazareh or Hazaret, which might easily have been changed into the word used by Esdras. I strongly recommend an inquiry into the literature and history of the Afghans." (*Asiatic Researches*.)

AFRANIUS, LUCIUS, a Latin comic poet, who lived about a century before Christ. He wrote comedies in imitation of Menander; and is commended by Tully and Quintilian for his acute genius and fluent style. Some fragments of his works only are now extant.

AFRICA, (derived according to Bochart from a Punic word signifying *Ears of Corn*), was represented by the ancients as one of the three great divisions or continents of which they believed the world to consist. —By them it was also called *Lilya*. Since the discovery of America, it has been considered by the moderns as one of the four quarters of the globe.

Excepting at its north-east corner, called the *Isthmus of Suez*, which is a neck of land, about sixty miles over, that unites it to Asia, Africa is entirely surrounded by water. On the north it is bounded by the Mediterranean sea, which divides it from Europe. Its whole western coast is washed by the waters of the Atlantic ocean, by which it is divided from America; and on the east, the Red sea and the Indian ocean separate it from Asia. From the Mediterranean sea, on the north, to the Cape of Good Hope, which constitutes its southern extremity, is no less than 4300 miles. Its

broadest part, from Cape Verd, in the Atlantic ocean, to Cape Guarda-fui, near the straits of Babel-Mandel, at the mouth of the Red sea, is 3500 miles from west to east. In shape it somewhat resembles a triangle, of which the Mediterranean sea and the Atlantic ocean form two sides, while the third side consists of the Red sea and the Indian ocean.

The greater part of this vast peninsula has in all ages remained unknown to the other inhabitants of the world. The general aspect however of its situation, represents it as well situated for maintaining a commercial intercourse with the other quarters of the globe. It stands as it were in the centre between Europe, Asia, and America; and therefore has a much nearer communication with each of them than they can have with one another. It is opposite to Europe, on its northern boundary, the Mediterranean sea, for almost 1000 miles in a line from east to west; the distance seldom 100 miles, never 100 leagues. It is opposite to Asia the whole length of the Red sea; the distance sometimes only 15 miles, seldom 50 leagues. Its coast, for about 2000 miles, lies opposite to America, at the distance of from 500 to 700 leagues, including the islands; whereas America is nowhere nearer Europe than 1000 leagues, and excepting at its north-west corner, where it is yet little known, is not nearer to Asia than 2500 leagues.

The knowledge of the ancients concerning Africa seems to have been, in a great degree, limited to the countries adjoining to the Mediterranean or to the Red sea. The ideas, however, which Herodotus entertained of this great continent are by no means incorrect upon the whole: and it has been reserved for our own times to verify a part of the description which he has given of the interior of Africa. Previous to his time, the whole sea coast of this continent had been explored by the conductors of an expedition fitted out by Necho, one of the kings of Egypt. It is to be observed that this Necho took Sidon, and reduced Phœnicia and Palestine. He must therefore have possessed considerable maritime power: Nor was he less powerful by land; for he marched through Palestine and Syria to attack the Assyrians near the Euphrates, and, in his way, defeated and slew Josiah the king of Judah, who opposed his march at Megiddo (2 Kings xxiii. 29.) Having defeated the Assyrians (or Babylonians) he placed a strong garrison in Carchemish, a fortified city on the Euphrates which he had taken; and, in his return, he took possession of Jerusalem, called Cadytis by Herodotus. This enterprising prince employed a body of Phœnician mariners to circumnavigate Africa, an undertaking which they accomplished with success. The following is the short narrative given by Herodotus of this remarkable transaction:

"Except in that particular part which is contiguous to Asia, the whole of Africa is surrounded by the sea. The first person who has proved this, was, as far as we are able to judge, Necho king of Egypt. When he had desisted from his attempt to join by a canal the Nile with the Arabian gulf, he dispatched some vessels, under the conduct of Phœnicians, with directions to pass by the Columns of Hercules, and, after penetrating the Northern ocean, to return to Egypt. These Phœnicians, taking their course from the Red sea, entered into the Southern ocean. On the approach of autumn they

Africa.

Africa little known.

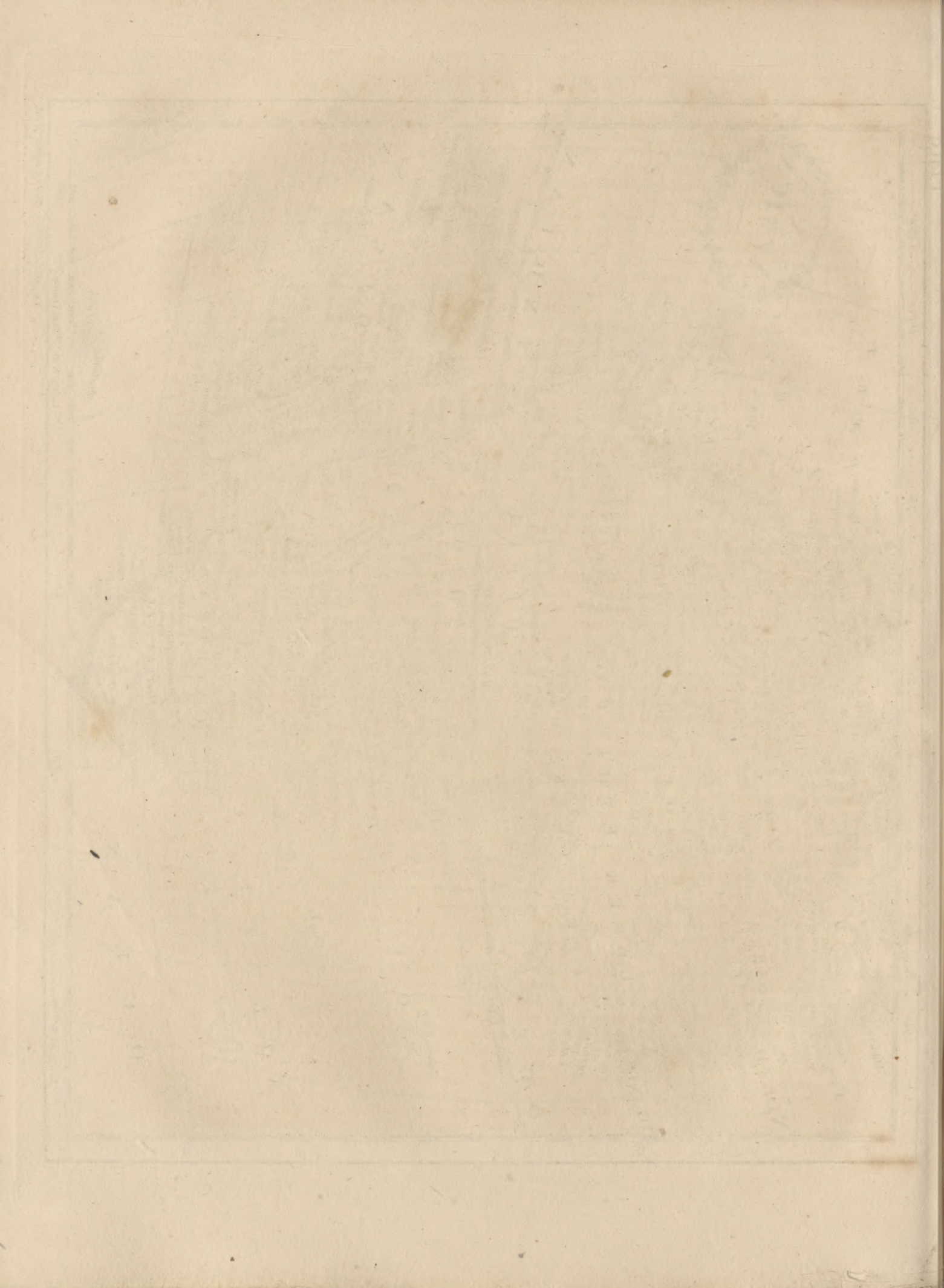
Expedition of Necho king of Egypt against Phœnicia.

Circumnavigate Africa.

Herodotus's account of it.



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they landed at Libya, and planted some corn in the place where they happened to find themselves: when this was ripe, and they had cut it down, they again departed. Having thus consumed two years, in the third they passed the Columns of Hercules, and returned to Egypt. Their relation may obtain attention from others, but to me it seems incredible; for they affirmed that, having sailed round Africa, *they had the sun on their right hand*. Thus was Africa, for the first time, known."

Many of the most eminent of the ancient historians and geographers regarded this account of the circumnavigation of Africa as altogether fabulous, chiefly in consequence of the story concerning the appearance assumed by the great celestial bodies in the course of the voyage, which was then unintelligible, from the imperfect state of the science of astronomy. But the very circumstances which, among the ancients, excited a doubt about the existence or success of such a voyage, must now be regarded as affording the most satisfactory internal evidence of the veracity of the ancient Phœnician navigators.

The Carthaginians were the rivals of the Egyptians in commerce, and must undoubtedly have explored a great part of the coast of Africa; but, according to the usual cautious and monopolizing spirit of commercial states, it is probable that they concealed their discoveries from other nations. As almost no monuments of their literature now exist, we are deprived of the means of investigating the full extent of their geographical knowledge. One important document has, however, reached our times, which demonstrates the enterprising spirit of that people. This is, an apparently abridged journal of a voyage to the western coast of Africa, undertaken by Hanno the Carthaginian, about 30 or 40 years after the expedition above mentioned under Necho king of Egypt. Herodotus does not seem to have been informed of this undertaking of Hanno; nor does Pliny appear to have seen the journal of the voyage, though he is no stranger to its contents.

Hanno is said to have deposited, at his return, the journal of his voyage in the temple of Saturn; which may perhaps account for the means of its preservation. It begins by stating, that "it was decreed by the Carthaginians that Hanno should undertake a voyage beyond the Pillars of Hercules, and found Libyphœnician cities. He sailed, accordingly, with 60 ships of 50 oars each, and a body of men and women to the number of 30,000, and provisions and other necessaries." From the extent of this plan of colonization, or rather of establishing permanent garrisons, upon the western coasts of Africa, it is evident that these coasts must, in some measure, have been previously examined. Major Rennel, who has investigated the subject with great accuracy, with a reference to the journal of the voyage, is of opinion that the Carthaginian or Libyphœnician cities founded by Hanno, were all situated to the south of the strait of Gibraltar, and to the northward of the river Senegal; and that all of them, excepting one at Cernè, now called Arguin, were placed to the north of Cape Bojador. To the southward of Cernè, Hanno during his voyage made two expeditions; but it does not appear that he made any attempt to fix an establishment beyond the limits now mentioned. On his first expedition, he seems to have sailed into the river Senegal, as may be supposed from the description given;

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for it is said to be "large and broad, and full of crocodiles and river horses". During the same voyage, Hanno made a second expedition southward, apparently for the sake of discovery. He appears to have doubled Cape Verd, and to have sailed across the mouth of the Gambia. His voyage is said to have terminated at a place which he calls the Southern Horn, supposed to be either at Sierraleona, or, at a little distance to the south of it, at Sherbro. It is evident, from the general style of the journal, that the Carthaginians, at the time of this voyage, were altogether unacquainted with the interior state of the country on this western quarter of Africa. Excepting the mere description of the coast, and its windings and bays, every thing is marvellous, and apparently fabulous. They talk of having caught two women covered with hair, whose skins they brought to Carthage, meaning, in all probability, two monkeys of some of the unknown species which abound in the country of the Negroes. They also talk of streams of fire, and of rivers of fire which seemed to be running into the sea. At one place, during the night, they saw a country which was on fire: and afterwards they saw another country full of fires; in the middle of which was a lofty fire, larger than the others, which seemed to touch the stars. When day came, they discovered this elevated fire to be a large hill, which they called *the chariot of the gods*. These wonders have been explained to us by later travellers; who remark that it is the custom, at certain seasons of the year, in the country of the Negroes, to set fire to the dry grass; and that on these occasions, during the night, the whole territory seems to be a sheet of flame.

With regard to Africa in general, Herodotus describes it in this summary way: "All that part of Libya towards the northern sea (Mediterranean), from Egypt to the promontory of Soloeis (now Cape Cantin on the coast of Morocco) which terminates the third division of the earth, is inhabited by the different nations of the Libyans; that district alone excepted in possession of the Greeks and Phœnicians. The remoter parts of Libya beyond the sea coast, and the people who inhabit its borders, are infested by various beasts of prey.—The country *yet more distant* is a parched and *immeasurable desert*." Here this ancient historian clearly distinguishes three belts or regions parallel to the Mediterranean, the northernmost of which we must conceive to have been that which extended along the sea coast, and was bounded on the south by Mount Atlas, and other ridges. The middle one is now called the Country of Dates, because the inhabitants chiefly live on that fruit; and the third is the great African desert. Beyond these, however, Herodotus had heard of a fourth region, belonging to the negroes; for, in another place he divides the inhabitants of Africa generally into two races (with the exception of strangers, viz. the Phœnicians and the Greeks). The natives (says he) are the Africans and Ethiopians, one of which possesses the northern, and the other the southern part of Africa.—By these nations are evidently intended the Moors and the Negroes, which two classes are as distinct at the present day as they were in ancient times.

This author, whose account of the ancient nations will always be a matter of much curiosity, because he has justly been called *the Father of History*, as being the earliest authentic historian whose writings have

been

Voyage of Hanno.

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been transmitted to us, gives a detailed account of the tribes that in his time inhabited the northern coast of Africa, upon the borders of the Mediterranean; beginning with Egypt and proceeding westward to the lesser Syrtis, mentioning only in general terms, the rest of the country to the promontory of Solocis, (Cape Cantin), which was erroneously regarded by him as the most westerly point of the coast of Africa. The people of this coast he represents generally as Nonades, from Egypt westward to the lake Tritonis, by which he means the lesser Syrtis, or gulf of Kabes; and the country, he says justly, is low and sandy. The country farther to the west, called *Africa Proper*, or *Nu-midia* by the Romans, including the present states of Morocco, Algiers, and Tunis, he describes as mountainous and interperfed with wood, and infested by wild beasts and serpents of an enormous size. Within this tract, however, he represents the inhabitants as husbandmen who cultivate the ground and live in houses. Mount Atlas is mentioned by him in the same magnificent terms in which all the ancient writers speak of it. "At every approach it appears round and steep, and so lofty that its summit can never be distinguished by reason of the clouds that envelope it."

Egypt was, in the days of Herodotus, a rich and populous state, from which the Greeks had derived a great part of their arts and of their religion. Beginning from Egypt and proceeding westward, he enumerates the Africans in the following manner. The first are the *Adymachidæ*, whose manners were in every respect Egyptian, that is to say, civilized. He imputes to them, however, a barbarous custom, that their king possessed the privilege of sleeping the first night with every new married woman. They inhabited the coast between Egypt and the port of Pleunos, adjoining to what is now called the *desert of Barca*. Next to the Adymachidæ were the *Gilligammæ*, who occupied the coast as far as the island of Aphrodisias, supposed to be near Derna. The *Aphylicæ* were a small inland tribe, situated between the Gilligammæ on the east, and the Aufchicæ on the west, having no communication with the sea. They were accounted remarkable beyond all the Africans for the use of chariots drawn by four horses; and, it is to be observed, that Herodotus says the Greeks borrowed from Africa the custom of harnessing four horses to a chariot. The *Aufchicæ*, who bordered on the west of the Aphylicæ extended from above Barca to the neighbourhood of the Hesperides on the sea coast. The *Cabales*, an inconsiderable tribe, occupied the coast opposite to the centre of the Aufchicæ, and extended themselves along the coast near Tauchira, a town belonging to Barca.

The province of Cyrenaica, (now Kairoan or Kurin), was situated within the tract of the Nonades. It was the most elevated part of it, and wonderfully fertile. It contained the first Grecian colony, and was also named *Libya Pentapolis*, from its having five towns of note in it, Cyrene, Barca, Ptolemais, Berenice, and Tauchira; all of which not only still exist as towns or villages, but it is remarkable that their names are scarcely altered, being called *Kurin*, *Barca*, *Tollamata*, *Bernicæ*, and *Taukera*. The celebrated gardens of the Hesperides were situated upon this coast on the western border of the desert of Barca.

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The *Nasamonæ*, according to Herodotus, were the most powerful of the Nomadic tribes upon this coast. They bordered upon the greater Syrtis, now called the *gulf of Surt*. He says, that during the summer season they leave their cattle on the coast, and go up into the country to gather dates at a place called *Augela*, which will be afterwards noticed. The Nasamonæ are said to have seized upon the territories of the Pphylli. These were a people who possessed the reputation of being able to charm serpents, and to cure the wounds occasioned by their stings. Cato is said by Plutarch to have carried some of the Pphylli with him for that purpose, in his memorable march round the greater Syrtis. It is certain that, in modern times, in Egypt, Abyssinia, and India, certain persons are believed to possess the power of completely subduing serpents of the most venomous kinds, so as to have them entirely under their command. They are said to seize on them with their naked hands, without apprehension of mischief, and this, not only on serpents they have already been accustomed to, but on such as they never saw before.

Beyond the Nasamonæ to the southward, Herodotus mentions the *Garamantes*, whom he represents as a numerous nation, situated ten journeys from Augela, between the Nasamonæ and the Macæ. The *Macæ* appear to have been the next tribe upon the coast after the Nasamonæ. The present towns of Mesurata and Lebida are situated within the territory that belonged to them. The *Gindanes*, *Lotophagi*, and *Machlyes*, in the order here mentioned, occupied the remainder of the space between the Macæ and the lake Tritonis, or gulf of Kabes; for Herodotus appears to have understood by the lake Tritonis, either the gulf alone, or the gulf and an adjoining lake *collectively*, which in his time very probably had a communication, though they are now separated by a neck of land, and the lake receives the name of *Loudeab*. It is to be observed, that the Lotophagi derived their name from the fruit of a tree or shrub called the *lotus*, upon which they subsisted, supposed to be the *ribannus lotus* of Linneus. It is not only found in this territory, but also upon the whole northern coast of Africa, and on many spots of the desert, and even in the country of the Negroes. To the westward of the lake Tritonis, Herodotus mentions the *Aufes*, the *Maxyæ*, the *Zavecæ*, and the *Zygantes*; which last appear to have been the inhabitants of the province that contained the city of Carthage: of the territories of this last state Herodotus gives no description, though he says, that he is able to name all the nations that inhabit the country as far as the Atlantes, beyond which he knows nothing. Some other positions in the north of Africa that were known in the times of Herodotus, will be afterwards mentioned.

With regard to the interior of Africa the knowledge of Herodotus was very indistinct. He mentions Ethiopia in a way that in some measure corresponds with Nubia, and Abyssinia: "Ethiopia, (says he), "which is the extremity of the habitable world, is contiguous to Arabia on the south-west. It produces gold in great quantities, elephants with their prodigious teeth, trees and shrubs of every kind, as well as ebony. Its inhabitants are also remarkable for their size, their beauty, and their length of life." To Ethiopia, however, he gives a wide extent, so as to include

Inhabitants
of Africa,
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tus.

Africa. clude the whole region inhabited by men of a black complexion, as he calls it, the "extremity of the habitable world." The remotest source of the Nile was unknown in his days; and after all the efforts that have been made for its discovery, it may be regarded as having hitherto been visited by no European. He supposes, however, that the course of the Nile, "without reckoning that part of it which flows through Egypt, was known to the extent of four months journey, partly by land, partly by water;" but beyond this its course was unknown, though he says "it is certain that the Nile rises in the west." The most remarkable fact, however, mentioned by Herodotus concerning the investigation of the interior of Africa consists of the adventures of certain *Najamones* who came from the neighbourhood of Cyrene, now called *Kurin*. He says that they made an expedition into the interior of Africa, with a view to extend their discoveries beyond all preceding adventurers. No attempt is made to state the distance to which they penetrated; but it must have been very great, "first proceeding through the region which was inhabited, they next came to that which was infested by wild beasts; leaving which, they directed their course westward through the desert, and were finally taken prisoners by black men of a diminutive stature, and carried to a city washed by a great river, which flowed from west to east, and abounded in crocodiles." Of this great river nothing farther was ever discovered by the ancients. Herodotus thought that it was probably the Nile, and Pliny calls it the river Niger, or the river of the blacks or Ethiopians.

The Romans were not a commercial people, and troubled themselves little about the discoveries of the Egyptians and Carthaginians whom they vanquished. The fertile districts, however, in the north of Africa adjoining to the shores of the Mediterranean, formed the chief granary of the empire during its most prosperous period. Beyond these districts they pushed their conquests only so far as was necessary to secure their possessions against the barbarians of the desert. Both Augustus and Nero, however, sent persons to attempt to discover the source of the Nile, but without success; and the Romans were never remarkable for investigating the state of foreign countries when they had no scheme of conquest in view. In the decline of the Roman empire A. D. 426, Bonifacius, the governor of Africa, revolted, and called in the aid of Genferic, the chief of a horde of barbarians called *Vandals*, who had penetrated from the north of Europe into Spain. These barbarians crossed the straits of Gibraltar, and soon became masters of the country. About a century thereafter, their descendants, in a fertile and enervating climate, having lost their military character, were vanquished by the celebrated Belisarius under Justinian, then at the head of the eastern division of the Roman empire. At a later period, when Mahomet had roused his countrymen to war and conquest, under the influence of a furious fanaticism, Egypt and the rest of the north of Africa were overrun by the Arabs, or, as they are called, the *Saracens*, A. D. 647. In a few centuries thereafter, the empire of the Saracens in Africa, where they were called *Moors*, was gradually divided into a variety of petty states called

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the *States of Barbary*, which acknowledged rather a nominal than a real dependence upon the Turkish empire. *Africa.*

The rest of Africa was forgotten till the fifteenth century, when the discovery of the mariners compass enabled the Europeans to extend their maritime enterprises to all the quarters of the globe, with a facility that was formerly unknown. In these enterprises the Portuguese took the lead. They had never sailed along the western coast of Africa, beyond Cape Non, in 27° north latitude till A. D. 1412, when they ventured 160 miles farther to Cape Bojador, whose rocky cliffs stretching out to a considerable distance into the Atlantic ocean, intimidated them from advancing farther. In 1419, when attempting to double this cape, they discovered the Madeira isles. Afterwards in 1433, they passed Cape Bojador, penetrated between the tropics, and discovered the river Senegal and the Cape de Verd isles situated between 14° and 18° north latitude. In 1471, they crossed the equator, and were astonished to find that the torrid zone contained fertile and populous regions, instead of being burnt up by perpetual heat as had been formerly believed. In 1484, the Portuguese navigators, now become ambitious of the reputation of discoverers of new countries, penetrated 1500 miles beyond the equator; and two years thereafter Bartholemew de Diaz discovered the Cape of Good Hope. In 1497, this cape, being the southern extremity of Africa, was passed by Vaquez de Gama.

At this time the European nations were fast emerging from barbarism. The feudal aristocracies, by which they had been kept in a state of perpetual anarchy, were gradually subdued by different princes, and a few powerful states or monarchies were raised upon their ruins. These states enjoying greater domestic tranquillity, were become capable of directing the energy and superior intelligence, which began to prevail in the European character, to enterprises requiring united and successive efforts. The discoveries of the Portuguese, by pointing out a very fertile region in the centre of Africa, in which gold and ivory could be obtained in exchange for the manufactures of Europe, and in which settlements could be easily formed, would in all probability have directed to this quarter the whole activity of the most enterprising of the European states, had not other events diverted them to different quarters. The events now alluded to, were the discovery of America by Columbus in 1492, and the easy communication with the East Indies, opened up by the discovery of the passage round the Cape of Good Hope. Hence it has happened, that during these three centuries Africa has been much neglected; and, in the most enterprising period of the history of the world, the European nations, though the most enterprising of mankind, have left in a great measure unexplored this immense continent, though situated in their vicinity, and abounding in valuable productions. A few factories for the purpose of procuring slaves have been established by the English, French, and Spaniards, upon the western coast, to the north of the equator. From thence to the tropic of Capricorn, the Portuguese have a few settlements, upon the east and the west coast, for the same purpose; and the Dutch settlement at the Cape of Good

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Hope,

Africa. Hope, is the only establishment at all worthy of the name of a European colony, retaining the language and somewhat of the manners of the parent state.

What is known of the interior of Africa, is chiefly the result of the efforts of particular travellers, who have penetrated into different quarters of that great continent, impelled by the ambition of extending the limits of human knowledge; or it is the fruit of the exertions of a private society of persons of rank in England, instituted in 1788, bearing the name of the *African Association*, who have employed, at their expence, various individuals to enter Africa at different points, and to proceed by such routes as have been thought most likely to lead to important discoveries.

African Association.

We shall now give a concise account of the great continent of Africa, so far as a knowledge of it has been obtained from these different sources. In the statement now to be given, however, we shall avoid taking any farther notice of that fertile stripe of territory on the north of Africa, which borders upon the Mediterranean sea, or upon the Atlantic ocean, southward to the mountains of Atlas, constituting the states of Egypt, Tripoli, Tunis, Algiers, Fez, and Morocco. Neither shall we take any notice of the country of Abyssinia at the head of the Nile, or of the Dutch settlement of the Cape of Good Hope, as each of these will be separately discussed under their proper names.

Divisions of Africa.

Africa, to the south of the states on the Mediterranean and of Morocco, consists of two great divisions, the *Sahara*, or great desert, which is the country of the Moors or Arabs; and *Nigritia*, *Negroland*, or the country of the Negroes or Æthiopians. The limits of these two divisions, though not in all cases accurately defined, depend on the soil and climate, and appear to have remained permanent from the days of Herodotus.

Sahara, or great desert.

The Sahara or great desert, extends from the south of Morocco and of the states on the Mediterranean, commonly called the Barbary States, to the rivers Senegal and Niger, or to a line drawn across the continent of Africa, from Cape Verd to the Red sea. Beyond the Sahara or desert, to the southward, is the country of the Negroes.

The Sahara presents a surface equal in extent to nearly one half of Europe. It is upwards of 800 miles in breadth from north to south, and more than double that extent in length from the Atlantic ocean on the west, to the frontiers of Abyssinia on the east. Its general description is that of a vast wilderness of lifeless sand, parched by the intolerable heat of an almost vertical sun. Its chief varieties consist of immense plains covered with naked pebbles, or of barren rocks towering towards an unclouded and burning sky. The fertility of the soil is rather marked than alleviated by some scattered plants, and by the verdure of a few valleys in which water either stagnates or springs up.

This general description, however, of the great African wilderness, is by no means to be understood as universal or without exception. The desert is here and there interspersed with spots of astonishing fertility, which are crowded with inhabitants. Every thing in the climate of Africa is in extremes. No cold is indeed experienced in that vast continent; but barrenness and fertility of soil border upon each other with a degree of suddenness, of which, in the temperate cli-

mates of Europe, we have no conception. The traveller passes in an instant from burning sands to a rich landscape, in which flocks and herds, and towns and villages abound. The same vicinity of a tropical sun which renders the wilderness intolerable, rears up all vegetable productions in the utmost luxuriance and perfection, in every spot in which water and a tolerable depth of soil are to be found. These sequestered situations in this great desert were called *Oases*, or *Islands*, by the ancients. Under the Roman empire it was not unusual to banish state criminals to an island in the great Libyan desert. The continent of Africa, like that of South America, is highest on its western side, and its greater rivers the Senegal, the Gambia, and the Niger, rise in a chain of mountains situated nearer to the Atlantic than the Indian ocean. As the Sahara extends towards the east, and also towards the shores of the Mediterranean on the north, its islands abound most in these regions. But the lesser islands are not always permanent. A furious wind from the desert, bringing along with it an immense quantity of sand, sometimes overwhelms a whole fertile district, and reduces it to barrenness. We shall here take notice, however, of such of the sequestered islands of this desert as are now known to be most important.

Africa.

The ancients mention very particularly under the name of Oasis three situations, called the *Greater Oasis*, or the *Lesser Oasis*, and the *Oasis of Ammon*. Of these the *Greater Oasis* is at present the best known to the Egyptians and the Arabs, because the caravans from Cairo to Darfur pass along it. It is named *Al-Wah*, or the *Oasis*, by way of excellence. It appears to consist of a number of detached fertile spots or islands, extending in a line parallel to the course of the Nile, and of the mountains that border the valley of Upper Egypt. The islands of the *Greater Oasis* are separated from each other by deserts of from two to 14 hours travelling. The whole extent of the chain is about 100 English miles, but by far the greatest part of it is desert. The whole Oasis is subject to Egypt, and has ever been reckoned an appendage to it, being distant from it about 90 miles. This Oasis contains abundance of date trees, and plenty of good water. The principal village in it is called *Ghagrá*, and is situated in 26° 25' N. Lat. and 29° 40' E. Long.

The *Lesser Oasis* does not lie in any of the tracks of the caravans, and is therefore little known. It is understood, however, to begin at the distance of about 40 miles to the northward of the *Greater Oasis*, and to proceed to a considerable distance in a direction towards the north. It is called by the neighbouring Arabs *Al-Wah-el-Gherbi*, which appears to mark poverty or inferiority, perhaps in comparison with the other. It consists, like the *Greater Oasis*, of a chain of narrow islands running parallel to the Nile.

The third Oasis contained the celebrated Temple of and oracle of Jupiter Ammon, which was visited by Julius Cæsar Alexander the Great. Though in its dimensions it is perhaps less than the two former Oases, it is undoubtedly the greatest, so far as historical importance is concerned. In the time of Herodotus, the state or Kingdom of Ammon occupied a considerable space betwixt Egypt on the east and the desert of Barca on the west, and between the Nomadic tribes along the coast of the Mediterranean on the north, and the great

Libyan

Africa. Libyan desert on the south.—As the ancient Persians worshipped one supreme deity whom they represented by the sun, and as they had a regular and well disciplined priesthood, they were taught to regard with indignation the idolatry of the Greeks. Hence the Persian monarch Cambyses sent an army against the Ammonians, with orders to burn the temple from whence the oracles of Jupiter were delivered. The expedition was unsuccessful, the army having been overwhelmed with sand, or left by their guides to perish in the desert; so that no remnant of them ever returned.—The position of the Oasis of Ammon has lately been ascertained by our countryman Mr Brown, who travelled into that quarter with a view to its discovery. It appears to correspond with the modern Siwah, in 29° 12' N. Lat. and 26° 18' E. Long. As a building of such antiquity must be an object of great curiosity, we shall transcribe Mr Brown's description of the small part of the temple that remains, the rest having been destroyed by the modern inhabitants of the country to build their houses and garden-walls.

Mr Brown's description of the temple. "It is a single apartment," says Mr Brown, "built of many stones of the same kind as those of which the pyramids consist, and covered originally with 6 large and solid blocks that reach from one wall to the other. The length I found 32 feet in the clear, the height about 18, the width 15. A gate situated at one extremity forms the principal entrance, and two doors also near that extremity open opposite to each other. The other end is quite ruinous; but, judging from circumstances, it may be imagined that the building has never been much larger than it now is. There is no appearance of any other edifice having been attached to it, and the less so, as there are remains of sculpture on the exterior of the walls. In the interior are three rows of emblematical figures, apparently designed to represent a procession; and the space between them is filled with hieroglyphic characters, properly so called. The socket is also adorned in the same manner; but one of the stones which formed it is fallen within, and breaks the connection. The other five remain entire. The sculpture is sufficiently distinguishable; and even the colours in some places remain."

Mr Horneman's. Mr Horneman, a native of Germany, a traveller employed by the African Association, has still more recently visited Siwah on his way from Cairo to Fezzan along with a caravan, in which he travelled under the character of a Mahometan merchant. He seems to think, that the total circumference of the ruins of the ancient temple of Jupiter Ammon may be several hundred yards, though in many places the outward wall has been entirely carried away. He seems to have measured the outside of the same building whose inside appears to have been measured by Mr Brown, and accordingly describes the length as from 30 to 36 feet, the width 24, and the height 27; but he was interrupted in taking his measurements by the jealousy of the natives. He also describes the ceiling as formed of vast blocks of stone of four feet in breadth, and three feet in depth, which extend across the whole building; and this roof seems to have preserved this part of the fabric entire, as the present barbarous inhabitants dare not attempt to demolish the walls, lest they themselves should be overwhelmed by the fall of the stones which form the roof. One of these stones of the roof

has fallen in, and is broken; "but the people, says Mr Horneman, have not been able to remove the large fragments fallen from the roof, which their ancestors were enabled to bring from the quarry, and to raise entire to the summit of the edifice: such are the vicissitudes of art, of knowledge, and of human powers and means, as well as of human happiness and fortunes."

The fertile part of the territory of Siwah appears to be about 18 miles in circumference, containing several small villages besides Siwah the capital. It is an independent state, acknowledging the Grand Seignior as lord paramount, but paying no tribute. It affords abundance of vegetable productions, with corn and oil; and is copiously supplied with water from springs and small streams, but none of them flow beyond its territory. They are either evaporated on approaching the surrounding desert, or, if they reach it, are lost in the sterile sand. Its government is vested in about 32 wealthy citizens, who assume the title of *scheiks*. Justice is administered according to ancient usage and general notions of equity. Fines, which are paid in dates, constitute the punishment. The dress of the men consists of a white cotton shirt and breeches, and a large piece of callico cloth striped white and blue, manufactured at Cairo, which is thrown over the left shoulder, and is called *melaye*. On their heads they wear a cap of red worsted or cotton, which is the distinction of a Mussulman, no Jew or Christian being permitted to use it. The women of Siwah wear wide blue shifts, usually of cotton, which reach to the ankles, and a *melaye*, above described, which they wrap round their head, and which falls over the body like a cloak. They plait their hair into three tresses one above the other, and fasten little bells to the lowest. They wear ear-rings and necklaces of glass beads. Those of the higher class wear round their necks a solid ring of silver thicker than the collar usually worn by criminals in some parts of the continent of Europe. There are many catacombs in the neighbourhood of Siwah, which formed the burying places of the ancient inhabitants, which show great labour and neatness of work.

The same traveller, Mr Horneman, on his way towards Fezzan, passed through Augila, an island or oasis in the desert, that was well known in the days of Herodotus. It is situated in 33° 3' N. Lat. and 22° 46' E. Long. The territory contains three towns, Augila the capital, Mojabra, and Meledila. Many of the inhabitants engage in the caravan trade. Those who do so, very frequently have three houses, one at Cairo, one in the territory of Augila, and a third in Fezzan, with a wife and family establishment at each. The country is level, and the soil sandy, but being well watered it is tolerably fertile. After a march of 16 days from Augila, Mr Horneman reached Temissa, in the territory of the important oasis Fezzan, of which we shall now give some account upon the authority of the journal which he has very recently transmitted to Europe.

Fezzan, the country of the ancient Garamantes of Herodotus, called by Pliny *Phazania Regio*, is upwards of 1100 miles west from Grand Cairo, and consists of an extensive plain amidst a surrounding wilderness of sand and of naked rocks.

The greatest length of the cultivated part of Fezzan

Africa. is about 300 English miles from north to south, and its greatest breadth from east to west is 200 miles. It contains 101 towns and villages, of which Mourzouk is the capital, situated according to Rennel, in 27° 48' N. Lat. and 15° 3' E. Long. The principal towns to the northward of the capital are Sochna, Sibha, Hun, and Wadon; Gatron to the south; and Quila to the east. The climate is never temperate. During summer the heat is intense, and the south wind is scarcely supportable even by the natives. A penetrating north wind prevails during winter, which drives to the fire even the natives of a northern country. Tempests of wind are frequent, which whirl up the sand and dust so as to give a tinge of yellow to the atmosphere. Rain falls seldom, and in small quantities. There is no river, nor even a rivulet deserving notice, throughout the whole country. The soil is what in Europe would be called a light sand, covering calcareous rock or earth, and sometimes a bottom of clay.

Productions of Fezzan. Dates are the staple produce of Fezzan, and in the western parts some fenna of a good quality is cultivated. Pot herbs are plentiful. Wheat and barley are suited to the soil and to the climate; but from the indolence of the people, and the oppression of the government, enough is not raised for the supply of the inhabitants, and they rely for a part of their subsistence on importations from the north. Horned cattle are only found in the most fertile districts. They are employed in drawing water from the wells, and are only slaughtered in cases of extreme necessity. The goat is the ordinary domestic animal, though sheep are bred in the southern parts. The wool is manufactured into coarse cloths, and along with the meat the skin is roasted and eaten. Horses are few. Asses are the beasts of general use, whether for draught or burden. Camels are excessively dear, and only kept by the chief people.

Mechanics of Fezzan. There are no other tradesmen in Fezzan than shoemakers and smiths, the latter of whom work every metal; and the same man forges shoes for the sultan's horse, and makes rings for his princesses. The value of the woollen cloth, which is manufactured by the women, may be estimated from this circumstance, that the weavers shuttle is unknown, and that the wool is inserted into the warp thread by thread, and the whole worked solely by the hand. Hence it happens, that though the commerce of Fezzan is considerable, it consists merely of foreign merchandise, brought by caravans from various quarters, which are here disposed of as at a central market. Cairo sends silks, calicoes, woollen cloths, glass, imitations of coral, beads, and East India goods. From Tripoli, a caravan brings paper, false corals, fire arms, sabres, knives, cloths called *abbés*, and red worsted caps. From Bornou, on the south-east, copper is imported in great quantities, and the caravans from the south or west bring slaves of both sexes, ostrich feathers, zibette, tigers skins, and gold, partly in dust, partly in native grains, to be manufactured into ornaments for the people of interior Africa. The smaller caravans of the tribes of the desert import oil, butter, fat, and corn, and those from the more southern districts bring fenna, ostrich feathers, and camels for the slaughter-house.

Government. Fezzan is governed by a sultan, descended from the family of the sheerefs; but he pays 4000 dollars annually, as a tribute to the basha of Tripoli; and in

his correspondence with that basha, he assumes only the title of scheik, instead of sultan. The throne is hereditary, but the eldest prince of the family succeeds, though a brother or a nephew, to the exclusion of the children of the last sultan, if they are younger. This law gives rise to many civil wars between the sons of their sultans and the collateral branches of the family.

The sultan's house or palace is within the fortrefs **Palace and** of Mourzouk. He has no other inmates than eunuchs, **harem.** His harem is contiguous. It consists of about 40 slaves, who are often sold and replaced by others if they have no children, and of a sultana, who must be of the family of the sheerefs of Wadon or Zuila. The sultan never enters the harem, but any female whom he wishes to see is conducted to his apartment.

The sultan gives audience three times a-day, in a **Ceremonies,** particular apartment, seated on an old-fashioned elbow chair, raised some steps, which forms his throne. Persons introduced kiss the hand of the sultan, then raise it so as to touch their foreheads, and then kneel before him. The sultan goes on Fridays to the great mosque on horseback, and on other days of solemnity he rides on a plain near the town, attended by his courtiers, who exhibit their skill in equestrian exercises and in shooting. His official attendants consist of two ministers, and of a number of black and a few white slaves, termed Mamelukes. All the interest and power rest with these Mamelukes, who are mostly Europeans, or their immediate descendants. The apparel of the **Dress of the** sultan, on days of ceremony, consists of the Tripolitan **sultan.** dress, over which he wears a large white embroidered shirt, made after the fashion of the Negroes. His turban extends a full yard from the front to the hinder part, and is two-thirds of a yard in breadth. His **re-** **Revenue-** venues consist of assessments on all cultivated lands, and of arbitrary requisitions, which are collected by his slaves in an oppressive manner, if they are not bribed. He also derives an income from duties on foreign trade, from certain territorial domains, and from salt pools and natron lakes. The present sultan has added to his treasures by predatory expeditions against the weaker tribes in the neighbourhood of his country. The chief booty upon these occasions consists of men and women, who are sold as slaves. The princes of the royal family are supported from certain territories allotted to them, together with a weekly distribution of corn from the sultan's stores, and occasional exactions from the people.

The clergy, and the *cadi* or chief judge, are supported by the produce of certain woods and gardens; and they possess great authority with the people. The dignity of *cadi* is hereditary in a certain family; but the sultan, upon every vacancy, appoints to the office that individual of the family who can best read and write, accomplishments which here seem to be somewhat unusual, and therefore much valued.

The population of Fezzan amounts to about 70,000 or **Population.** 75,000 souls. In the southern districts they have mixed with the natives of the desert, whom they resemble; but the original Fezzanians are a people of ordinary stature, of a deep brown complexion, with short black hair and regular features. They possess little energy **Character.** either of mind or body. Almost their only food consists of dates, or of a kind of farinaceous pap, with no butchers meet. The men who can afford it are much addicted

Africa. addicted to drunkenness. They use a very intoxicating liquor prepared from dates. The women have a great fondness for dancing, which they practise publicly, not only in the day time but after sunset. The amusement is thus described by Mr Horneman: "Two or three men stand together with their tambourins; the women immediately form a circle round the men, beat a tune, and those in the circle accompany it with fingering and clapping of hands. A girl then advances dancing towards the drummers; the men, as she approaches near them, join in the dance, and press towards her; on which she makes some steps backwards, and then falls on her back with her body and limbs stiff and perfectly straight; when the women behind catch her in the fall, a few spans from the ground, and toss her in the air, whence she descends on her feet. The men then resume their station in the centre, and a second female dancer repeats the sport, which is successively engaged in by each brisk damsel of the circle."

Habits and amusements.

Dancing.

Musical instruments.

Diseases.

Empire of Cassina.

Trade in salt.

Bornou.

In Fezzan there are great numbers of loose women, and also of singing girls whose song is Sudanic, that is derived from the country of the Negroes. Their musical instrument is called *rhababe*; it is an excavated hemisphere, made from a shell of the gourd kind, and covered with leather; to this a long handle is fixed, on which is stretched a string of horse hairs longitudinally, closed and compact as one cord, about the thickness of a quill. This is played with a bow.

Various sorts of venereal disorders prevail in Fezzan; but it is worthy of remark, that, for the cure of all the species, they only use salts and the fruit *bandal* (colycinth) as powerful cathartics; the sores, if any, are at the same time washed with a solution of soda; and these remedies seldom fail. Other maladies prevalent there are the ague and hæmorrhoids, for neither of which have they any other remedy than amulets, consisting of certain sentences of the Koran written on a slip of paper, which the patient wears about his neck, and in bad cases is made to swallow. It is said, however, that their knowledge of surgery is sufficient to enable them to cure a simple fracture.

South from Fezzan a variety of other islands are scattered, which have been united by conquest under one chief, and receive the name of the empire of Cassina or Kasseena. The territories of this empire, therefore, consist of a considerable quantity of land of amazing fertility, interspersed with arid wastes, where the rays of the sun, reflected from the sand or the rocks, produce the most intense and suffocating heat. Cassina, the capital, is situated in N. Lat. 16° 20'. W. Long. 11° 45'. Agadez, which is an island, or province as it may be called, of the empire of Cassina, sends annually a caravan of 1000 camels to certain salt lakes in the desert, at a place called Dombou; and the salt is distributed among the other islands or provinces of this empire.

A similar empire, as travellers are pleased to call it, consisting of a number of fertile spots of this immense desert, is called Bornou. Mathan, the capital, is situated in N. Lat. 24° 32'. E. Long. 22° 57'. It is surrounded by a ditch, and a wall 14 feet in height. The king is said to be more powerful than the emperor of Morocco. His dominions extend beyond the desert into the fertile country of the Negroes, of which he pos-

sesses a large portion. He is elected by three of the principal chiefs; but the choice is restricted to the royal family. The military force of the state consists of cavalry armed with the sabre, the pike, and the bow. Fire-arms are not unknown, but they are too difficult to be procured.

Besides these, there is a variety of other districts of this desert, of which some slight intelligence has been obtained; such as Gadamis, north-west from Fezzan, about N. Lat. 32°; south-east from which is another island, called *Tuat*, at the distance about 400 miles. On the south-east of Fezzan is *Tibesti*, at the distance of 200 miles: eastward of which, and 500 miles from the Nile, is *Bardoa*. *Zegzeg* and *Kuar* are in the same vicinity. Farther to the south is *Bergoo* and *Darfoor*. This last lies to the southward of the general latitude of the great desert. It has of late years been made known by Mr Brown, the first discoverer of the Oasis of Ammon. He penetrated into Darfoor in 1792, and remained there a considerable time. Its chief town, *Cobbé*, is situated in 14° 11' N. Lat. and 28° 8' E. Long. and the country contains about 200,000 inhabitants, consisting of native tribes of a deep black complexion and woolly hair, though with features different from those of the Negroes, and of Arabs of various tribes. The wild animals are, the lion, the leopard, the hyæna, the wolf, and the wild buffalo. The domestic animals are, the camel, the sheep, the goat, and horned cattle. Considerable quantities of grain of different sorts are reared, and, as the country is within the tropics, after the periodical rains the fertility is very sudden and great. The people are very barbarous. The practice of polygamy is not only established, but the intercourse of the sexes is totally destitute of delicacy or decency. The most severe labours of the field are left to the women; and the houses, which are of clay covered with thin boards, are chiefly built by them. Salt is the general medium of commerce at Darfoor, as gold dust is in many other places of Africa. This territory is governed by a chief, who calls himself sultan, and assumes the most extravagant titles. He appears in public on a splendid throne, while an officer proclaims, "See the buffalo, the offspring of a buffalo, the bull of bulls, the elephant of superior strength, the powerful sultan Abd-el-rachman-el-rashid. May God preserve thy life! O master, may God assist thee, and render thee victorious!"

These islands of the African desert are too little known to render valuable any attempt at a more minute description of them. They all resemble each other in the fertility of their soil and the barbarous state of their inhabitants, who are Mahometans, unless where they approach the country of the Negroes. Though they maintain towards each other the maxims of apparent hospitality, yet a Christian is everywhere odious; and they account it meritorious to persecute or enslave him. Their language is chiefly a dialect of the Arabic, and their literature is in a great measure confined to reading the Koran. Their only intercourse with other nations is carried on by the caravans which periodically traverse these immense deserts: and the smaller islands that are neglected by the caravans are sometimes absolutely forgotten by the rest of the world for many years; and their inhabitants, left to themselves and to their native ignorance, at last imagine,

Africa.

Sultan of Darfoor.

Extraordinary titles.

Africa.

gine, that, except their own little territory, the whole earth resembles the great desert which they see around them.

Tribes of
Monsele-
mines in
Western
Africa.

Govern-
ment.

It is to be observed, that the Sahara, or great wilderness, does not on its western boundary all at once attain its utmost degree of barrenness. Immediately to the south of Morocco, and of the mountains called Mount Atlas, is a considerable extent of territory inhabited by a tribe called the *Monselemines*. In their manners, they differ considerably from the Moors on the coasts of the Mediterranean, and also from the Moors or Arabs of the desert. Their civil government is republican, as they choose new chiefs every year, who are accountable to the aged men of the community. It is probable, however, that order is preserved among them chiefly by the influence of their priests, who are greatly respected; and the influence of the high priest amounts almost to despotic power. The people are chiefly engaged in a sort of pastoral life, to which agriculture is occasionally united. They have also villages in which various tradesmen reside, chiefly weavers, shoemakers, smiths, and potters, who have no cattle: But some opulent persons residing in the towns have flocks and herds of cows, horses, camels, sheep, and goats, besides poultry, kept by slaves at a distance in the country. The soil possesses considerable fertility, and produces the necessaries of life with little cultivation. The plains abound with date, fig, and almond trees; and grapes are cultivated. Oil, wax, and tobacco, are also produced, and sold in the villages. Their agriculture is very rude. The chiefs of families, or small tribes, choose the ground most fit for cultivation. Its surface is slightly turned over with a kind of paddle, for the plough is unknown; and then the seed is sown upon it. The spot is then deserted by the inhabitants, who wander in all directions with their cattle, and do not return till harvest, when the corn is cut down and threshed. Magazines are then formed, consisting of holes in the earth, into which the corn is put. Planks are laid over it, which are covered with a layer of earth, made level with the soil, to prevent its being discovered by enemies. These magazines belong to every chief of a family or tribe, in proportion to the number of men he employed in the common labour.

Produc-
tions.

Rude agri-
culture.

Wars.

The *Monselemines* are almost constantly engaged in war against the emperor of Morocco. They are extremely jealous of their independence and freedom; and their country is the retreat of all the discontented Moors. No sooner does the emperor of Morocco take the field against them, than the whole inhabitants of the country districts mount their horses; and, while a part of them escort the women and slaves, and cattle, to places of safety, or even into the desert if they are close pressed, the rest of them occupy the passes of the mountains, and meet the enemy. During peace, parties of them often undertake to escort caravans, by which means there is preserved among them a considerable military spirit. In other respects, they bear a great resemblance to the ancient Arabs. They permit polygamy, but their women are not so much secluded from society as among the Moors on the sea-coast. Their children are brought up with care, and are not considered as men till they exhibit some proofs of their courage. Jews are permitted to live among

Manners.

them in their villages, but they are not allowed to cultivate the earth, or to carry arms. Christians are much hated; but a Christian slave is better treated than among the other Arabs, because the avarice of the *Monselemines* is greater than their fanaticism. As their slaves constitute their riches, they treat them tolerably well from a principle of prudence.

Africa.

To the south of the country of the *Monselemines*, upon the coast of the Atlantic, is the wandering tribe of *Wadelims*; to the south of whom are the *Labdessebas*: And next to these are the *Trafarts*, who border with the country of the Negroes. Eastward along the northern frontier of the Negroes lie the Moorish states of *Jessnoo*, *Ludamar*, and others. With the exception of these small states, it is to be observed, that the great desert, or Sahara, reaching from the Atlantic ocean to the frontiers of Abyssinia, and from the vicinity of the Mediterranean to the country of the Negroes, is possessed by two great Moorish nations called the *Tuarick* and the *Tibbo*. Of these the *Tuarick* is the most powerful: It consists of the whole desert westward from the meridian of Fezzan. The desert, or Sahara, eastward from the same meridian belongs to the *Tibbo*. The manners and character of the whole of these tribes, whether great or small, is nearly or altogether similar. The desert which they inhabit is parched and uncultivated. Many places of it have the appearance of being capable of cultivation, as shrubs grow in various situations; and palms, or dates, rise at distant intervals. But the flying sand is the great obstacle to cultivation, by rendering the result of it uncertain. The sand drifts with every gale, and is at times accumulated into high mountains, which disappear as the winds blow. Thus it is shifted about with every change of the blast, excepting when the air is entirely stagnant. When the sand shower becomes formidable, the Moors are obliged to load their camels, turn their backs to the gale, and hasten away, to avoid being buried alive.

As water is very scarce in the desert, the Arabs or Moors form large holes for reservoirs to collect the rain water, which, though it soon becomes putrid and disgusting, is the only drink of man or beast. From the scarcity of water, they have few horned cattle; and their flocks consist chiefly of sheep, goats, and camels, animals which are patient of thirst. None but the wealthiest Arabs, who possess numerous herds, are able to maintain horses, as it is often necessary to give them milk to drink instead of water. The urine of the camels is carefully preserved to wash the vessels used to contain food; and the Arabs are frequently under the necessity of drinking it, mixed with milk, for the purpose of allaying their thirst. As their riches consist of their herds and flocks, they attend them with the greatest care. If a beast be sick, it is attended with more anxiety than a man; but if it seem likely to die, they kill and eat it. If it die before its blood be shed, it is accounted unclean, and is never eaten.

The Sahara, or desert, abounds in antelopes, wild boars, leopards, apes, and serpents. The Arabs or Moors are expert hunters, and, as the leopard's skin is an article of commerce, that animal from being frequently attacked, learns to keep at a distance from their habitations. Hunting the ostrich is a favourite amusement. It is undertaken by about twenty horsemen who

Africa. who advance in a line against the wind, at the interval of a quarter of a league behind each other. As soon as the foremost perceives an ostrich he rushes upon it. The ostrich cannot fly but with the assistance of its wings: it runs in the direction of the wind, and though it may avoid a few of the Arabs successively, cannot escape the whole number. In their hordes, the Moors or Arabs lodge by families in tents covered with a cloth of camels hair, which the women spin and weave. The furniture of the tent consists of two large sacks of leather, in which they keep their clothes and pieces of old iron, a few goat skins for holding milk and water, two large stones for grinding their barley, a mattress of oser which serves for a bed, a carpet for a covering, a small kettle and some wooden dishes, with pack saddles for their camels. They often associate to convey salt which abounds in the desert into the country of the Negroes; for which, in return, they bring back provisions and blue cotton cloth and slaves. They also associate for war and for hunting; and in most cases, where the property acquired consists of goods which can be packed up into parcels, they divide it into shares, which they cover up, and fix upon a woman, a child, or a stranger, who knows nothing of the contents of the various parcels, to distribute them by hazard to the different associates of the enterprise.

Hunting the ostrich.

The Arabs live in tents.

Furniture.

Trade.

War.

Division of spoil.

Artificers. The only artificers among the Moors of the desert, are smiths, or a kind of tinkers, who go among them from the country of the Monfelemine to mend their broken vessels, or repair their arms, and are paid in skins, goats and camels hair, or ostrich feathers, according to agreement. All of them are more attentive to their arms than to their dress; the latter of which often consists only of a long blanket which they wrap round them, with a cloak of camels hair, and more frequently of goats skins. They wear loose frocks or shirts, however, of blue cotton cloth, if they can procure them from the Negroes, by whom this cloth is manufactured. Their arms consist of daggers and clubs, with sabres and muskets if they can obtain them. To this general description of poverty, however, some of the Moors of the great inland nation or tribe of Tuarick form an exception, in that part of the desert which borders upon Fezzan, where they have an opportunity of acquiring wealth by engaging in the caravan trade. Mr Horneiman saw at Fezzan many individuals of the Hagara, one of the tribes of the Tuarick, and describes them thus: "The Hagara are yellowish, like the Arabs; near Soudan, there are tribes entirely black. The clothing of this nation consists of wide dark blue breeches, a short narrow shirt of the same colour, with wide sleeves, which they bring together and tie on the back of their neck, so that their arms are at liberty. They wind a black cloth round their head in such a manner, that at a distance it appears like a helmet, for their eyes only are seen. Being Mahometans, they cut off their hair, but leave some on the top of the head, round which those who wear no cap contrive to fold their black cloth, so that it appears like a tuft on their helmet. Round their waist they wear a girdle of a dark colour. From several cords which fall from their shoulders hangs a Koran in a leather pouch, and a row of small leather bags containing amulets. They always carry

in their hands a small lance neatly worked, about five feet long. Above the left elbow, on the upper part of the arm, they wear their national badge, a thick black or dark-coloured ring of horn or stone. Their upper dress is a Soudanian (Negro) shirt, over which a long sword hangs from the shoulder. The travelling merchants of this nation carry fire arms, though others use only the sword, the lance, and the knife, which they carry on their left arm; but the handle is finely worked; for they have the art of giving to copper as bright a colour as the English artists, and this art they keep very secret. They carry on a commerce between Soudan, (i. e. Nigritia), Fezzan and Gadamis. Their caravans give life to Mourzouk, which without them is a desert; for they, like the Soudanians (Negroes) love company, song, and music. The Tuarick are not all Mahometans. In the neighbourhood of Soudan and Tombuctoo live the Tagama, who are white, and of the Pagan religion."

Hospitality. Hospitality is the most remarkable virtue of the Moors, or Arabs of the desert. The chief of a horde is by custom bound or entitled to entertain all strangers; but every tent contributes to his stock of provisions. When a stranger reaches an Arab horde, the first person who perceives him points out the tent of the chief. If the master is not present, the wife or the slave comes forth to meet him, and brings him milk to drink. His camels are then unloaded and his effects ranged around him. His arms are deposited near those of the master of the tent. The Arab, who in the field is a rapacious plunderer, in his tent is generous and hospitable; and the person of an enemy is inviolable, though he should have killed the near kinsman of its master. All this, however, is chiefly to be applied to persons of their own religion; for towards Christians and Jews, their fanaticism renders them extremely intolerant. A Jew, more especially, if discovered, can scarcely escape alive from among them.

Manners. Polygamy is allowed among the Arabs of the desert, as among other Mahometans; but it is very effectually restrained by the poverty of the people. Divorce is permitted at the will of either party; but if a male child is born, the marriage becomes indissoluble. In the education of children force is never employed. **Education.** The priests, who are the teachers, instruct them to read the Arabic characters and sentences of the Koran; but if the child become weary of the school, he quits or returns to it at pleasure, without being reproached.

Property descends by inheritance in equal shares to the male children; but the females have no share, and are obliged to reside with their eldest brother. The chief of the horde becomes the guardian of the children who are left orphans. Property is ill secured by their customs. If a thief is caught in the fact he may be punished; but if he escape with his booty, it cannot afterwards be claimed.

The abstinence and hardships which the Moors of the desert are frequently under the necessity of encountering, and their habits of predatory war against passing caravans, or hostile tribes, bestow upon them an evident superiority over the more peaceful tribes of Negroes who inhabit the fertile regions of the south. They possess also the knowledge of writing, and of the Arabic language, which inspires them with no small confidence of the importance of their own character.

Africa.

Hospitality.

Manners.

Education.

Mode of succession to property.

Character of the Moors.

and

Africa. and accomplishments. Hence, they assume a haughtiness of gait, and a ferocity of aspect, which distinguishes them no less than their complexion from the Negroes in their neighbourhood. Such is the presumption resulting from these sentiments, that though a small party of Negroes would never risk themselves in the desert, one or two Moors will travel with impunity through all Africa, and plunder the Negroes by whom they have been entertained.

Periodical rains. As the equator passes almost through the centre of Africa, by far the largest portion of that great continent is situated within the torrid zone, and is possessed by the Ethiopians and Negroes, who are called by the Arabs *Biled-al-Soudan*, or *Biled-al-Abiad*, the land of blacks, or the land of slaves. In all countries within the tropics, excessive rains fall twice every year about the time of the vernal and of the autumnal equinoxes. At these periods every river is swelled into a mighty flood, and if the country be level it is completely inundated. From this circumstance, along with the heat of the climate, arises the extreme fertility of the middle regions of the globe.

Negroeland. River Senegal. Niger. Though the *Sabara*, or great African desert extends a few degrees beyond the tropic of Cancer, yet its boundaries begin to be ill defined; fertile spots become more frequent; and at last, in the latitude of the Cape de Verd isles, and in the neighbourhood of the first rivers, the Senegal and the Niger, the gum forests mark the commencement of the land of the Negroes. About 600 miles from the western coast, in the mountains of Kong, the river Senegal takes its rise, and flows westward into the Atlantic ocean. The same mountains are the source of the great river of the Ethiopians, the Niger, the knowledge of which, from the time of Herodotus, seems to have been lost by the European nations, and has only been recently restored in consequence of the intrepid and persevering exertions of our countryman Mungo Park, who had been employed by the African Association to endeavour to discover whether its existence ought to be regarded as a reality or as an error of the ancient geographers. It runs eastward; but its termination, as will be afterwards noticed, is still unknown.

To the south of these rivers, all Africa belongs to various nations of Negroes, among whom considerable varieties of appearance and of character exist. In general, however, they are distinguished by short woolly hair, flat noses, thick lips, and black complexion, while their intellectual powers have been supposed by some to be inferior to those of the civilized European or Asiatic nations. Some modern writers, however, such as Bruce and Volney, are of opinion, that the elements of the arts and sciences came originally from Upper Egypt and Abyssinia, and the ancients appear to have ascribed to the Ethiopians the commencement of civilization among mankind. "The Thebans (says Diodorus) consider themselves as the most ancient people on the earth; and assert, that with them originated philosophy and the science of the stars. Their situation, it is true, is infinitely favourable to astronomical observation, and they have a more accurate division of time into months and years than other nations." The same opinion he attributes to the Ethiopians. "The Ethiopians conceive themselves to be of greater antiquity than any other nation; and it is probable that,

born under the sun's path, its warmth may have ripened them sooner than other men. They suppose themselves also to be the inventors of divine worship, of festivals, of solemn assemblies, of sacrifices, and every other religious practice. They affirm that the Egyptians are one of their colonies; and that the Delta, which was formerly sea, became land by the conglomeration of the earth of the higher country, which was washed down by the Nile. They have, like the Egyptians, two species of letters, hieroglyphics, and the alphabet; but among the Egyptians, the first was known only to the priests, and by them transmitted from father to son, whereas both species are common among the Ethiopians." "The Ethiopians (says Lucian) were the first who invented the science of the stars, and gave names to the planets, not at random, and without meaning, but descriptive of the qualities which they conceived them to possess; and it was from them that this art passed in an imperfect state to the Egyptians."

But though the antiquity of the civilization of Egypt cannot be disputed, there is little reason to believe that the middle regions of Africa ever exhibited the human character in a higher state of cultivation than it now possesses there. In all ages its inhabitants were engaged in the barbarous practice of selling each other into slavery to distant nations. No remains of ancient magnificence are to be found in their country, nor any instruments of art which mark the genius of an improved people. Even the plough is still unknown, and the ingenuity of man is only exerted to supply his most simple wants.

A great part of the country of the Negroes receives among Europeans the name of Guinea, a term as old as the time of Ptolemy, who applies it to the maritime districts, though this name is said to be utterly unknown to the natives of the country themselves, excepting where they have learned it from European traders. It would appear, however, to have originated from one of the central states or empires of Africa, upon the banks of the Niger, which though once possessed of great power, has now fallen into decay, and is lost in the empire of Tombuctoo, and some neighbouring states.

The middle regions of Africa bring to maturity all the tropical productions or fruits in their utmost perfection and abundance. With the slightest cultivation, rice, maize, millet, sugar, cotton, indigo, &c. are raised, along with some fruits peculiar to itself, among which may be mentioned the shea-tree, from which the vegetable butter is prepared, which forms a principal article of commerce in all the interior districts. The shea-tree is said to resemble the American oak; the butter is prepared from the kernel of the fruit. This kernel resembles a Spanish olive, and is enclosed in a sweet pulp under a thin green rind. It is dried in the sun, and then boiled in water. Travellers tell us that the butter produced from it is white, firm, and better flavoured than that of milk. If this account of it be correct, which we have no reason to doubt, measures ought certainly to be taken for conveying this tree to the European settlements in the West Indies, and for cultivating it there, as it would undoubtedly be very valuable when reared in the vicinity of the *Bread-fruit tree*, which has lately been brought from Otaheite.

Various

Africa.

Wild animals.

Snakes very destructive,

and of immense size.

The camelion.

Immense myriads of ants.

Spiders.

Metals.

Iron and Gold.

Various species of wild beasts inhabit this country, as lions, leopards, hyenas, elephants, buffaloes, wild boars, rhinoceroses, with great variety of the species of deer, and various kinds of monkeys. Innumerable species of snakes are also to be found here; one of the most remarkable of which, called the *finyacki*, is of a pale green colour, with black spots, about a foot in length, and as thick as a man's finger. It possesses the power of ejecting a subtle vapour into the eyes of any animal that approaches within the distance of two or three feet, so as to occasion extreme pain for several days, and even incurable blindness. Another species of snake, said to be found also in Ceylon, grows here to the enormous size of 50 feet in length; the colour of the back is dark gray, with lines of a dusky yellow: part of the belly is of a lighter colour and spotted: it lurks, in moist situations, wreathed into curls, which include a space of about five feet diameter, and give it at a distance some resemblance to the mouth of a well. Over these curls or rings it rears its head and part of its body, and remains immovable till some animal approach within its reach, when it darts upon it; and, if the animal is large, twists its body round it, and with an immense force crushes all its bones; and, having lubricated it with saliva, swallows it entire. After having devoured in this manner a large animal, the snake remains as if lifeless for many days during the process of digestion, and in this situation may be easily destroyed. The camelion is also found in this country, along with an immense variety of reptiles. Of these the ants are the most formidable and destructive to man. They differ in size from an inch in length to a minuteness that is almost imperceptible to the naked eye. They sometimes burst from their nests in such innumerable myriads as to destroy every thing on the surface of the earth, and to oblige the natives to desert their habitations. They often extinguish fires by their numbers, and form bridges of their own dead bodies over shallow waters which impede their progress.—One species forms swarms like bees, and erects round pyramids of clay which becomes extremely hard. These pyramids are usually eight or ten feet high. Their interior consists of galleries suited to the size of the animal, interwoven like a labyrinth, having a small opening as a door or entry to the dwelling.

Monstrous spiders also exist in this country, a single thread of whose web, it is said, will support a weight of several ounces.

The natives of this country have too little art or industry to take much advantage of the metals with which the earth is supposed in many places to abound. In some situations, however, they produce iron of a tolerable quality, but gold is the chief object of their search. It does not appear, however, that they have ever wrought the mines of it which they have discovered to any depth, and it is chiefly procured from the sands of the rivers or of torrents after violent rains. It is then collected in some districts in considerable quantities, and forms an important article of commerce. Women chiefly engage in this employment, and an individual may collect in general during the dry season, as much as is equal to the value of two slaves. The gold obtained is either used in commerce or wrought into ornaments for the women. The stand-

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ard of value is called *menkalli*, which is equal in value to about 10s. Africa

In general, however, it may be remarked, with regard to all the natural productions of this continent, whether animal, vegetable, or mineral, that they still remain in great obscurity, and present a vast field for the investigation of the natural historian. Natural productions little known.

The general character of the Negroes, who are the inhabitants of these fertile regions, is that of extreme levity. It is said, that they will dance for almost 24 hours together, and they do not suffer their gaiety to be disturbed by events, which, in other countries, are productive of much unhappiness. They do not appear to want the feelings of humanity, nor are they more destitute of sagacity than other men and women of an equal degree of education; but the general fertility of their country, which supplies them with food in consequence of the exertion of a very slight degree of industry, and the little occasion they have for clothing amidst the heat of their climate, produces an indolent and general habit of seeking present pleasure, and of banishing from their minds all care for the future. Character of the Negroes.

The kind of government that exists among the Negro nations is by no means uniform. In many districts the country is governed by an immense multitude of independent petty chiefs, who are engaged in frequent wars with each other. In other places the talents of individual chieftans have been able to reduce considerable tracts of territory under their dominion. In such cases, in consequence of the internal tranquillity produced by the extension of the prince's power, flourishing towns have grown up. Thus upon the river Niger stands the town of Sego the capital of Bambara, which was visited by Mungo Park, and which lies in N. Lat. 14° 10', and W. Long. 2° 26', containing about 30,000 inhabitants. Two hundred miles below this upon the same river stands Tombuc-tou, the great centre of the commerce of Fezzan, Cairo, and the countries on the north of Africa, with the land of the Negroes. Farther down the same river stands Houffa, which is understood to be a city of still greater extent. Many of the Negro towns are fortified with ditches and walls, built like the houses of the natives of clay and stone. The trenches are sometimes flanked with square towers like a regular fortification, and the walls are very high. Town of Sego. Tombuc-tou. Houffa.

Domestic slavery prevails in a very great degree among all the Negro states. As the tropical rains sometimes fail or are deficient in quantity, the scorching heat of the sun burns up the face of the country, and produces a most frightful barrenness. On these occasions it is not uncommon for parents to sell their children, and even themselves, for bread. A freeman may also lose his liberty by being taken prisoner in war, or on account of the real or supposed crimes of murder and forcery. He also forfeits it in consequence of insolvency. From these causes domestic slavery prevails to such a degree, that in many places three-fourths of the natives are slaves. These slaves, however, form in some measure a part of the community; and, by the custom of the country, the master cannot sell one who is born his slave, without accusing him of a crime, a circumstance, which, in consequence of

Africa. of the slave trade at times, gives rise to much dissension, and to wars which resemble, in some measure, the sanguinary contests which existed in various countries in Europe, during the feudal times, between the villains and their lords. Thus, in 1785, a general insurrection took place in many districts on the western coast: the slaves attacked their masters, massacred great numbers of them, set fire to the ripe rice, blockaded the towns, and obliged them to sue for peace.

Arts in a rude state.

Few arts have been brought to much perfection by the Negroes, because the division of labour has been little known among them. The same individual spins, weaves, sews, hunts, fishes; forms baskets, fishing-tackle, instruments of agriculture; makes soap, dyes cloth with indigo, and makes canoes. In all these, the neatness of the work excites the astonishment of strangers who know the diversity of occupations in which the same individuals engage, and the imperfection of the tools with which they labour. They are no strangers, however, to that ordinary division of labour to which nature herself seems to have given rise in consequence of the distinction of the sexes. The women spin, and the men weave the cotton cloth of which their dresses are composed. The cotton is prepared for spinning by rolling it with an iron spindle upon a smooth stone or board. The thread is well twisted though coarse, but the loom is so narrow that the web is only about four inches broad. The women dye this cloth with the leaves of indigo, pounded fresh, and mixed with a strong alkaline ley, formed by the lixivation of wood ashes. The colour thus produced is a rich and durable blue with a purple gloss.

Weaving.

Dyeing.

The workers in metals and the manufacturers of leather appear to be almost the only instances of what may be called a separate profession existing among the Negroes. The manufacturers of leather separate the hair by steeping the hides in a mixture of wood ashes and water, and use the pounded leaves of a tree called *goo*, as we do the oak bark, for the purpose of tanning. They dye the skins of sheep and goats red with powdered millet stalks, and yellow with a root which abounds in their country. The manufacturers of iron smelt that metal in some of the interior districts; but it is generally hard and brittle. They form their weapons and tools of it, however, with considerable ingenuity. In smelting gold they use fixed alkaline salt, obtained by washing with water the ashes of burned corn stalks, and evaporating the ley to dryness. It must also be remarked, that, in the interior of the country, Mungo Park found a Negro who manufactured gunpowder from nitre collected from the reservoirs of water frequented by the cattle, and sulphur supplied by the Moors, who obtain it from the Mediterranean. He pounded the ingredients in a wooden mortar, and granulated it; but the grains were unequal, and the strength of the gunpowder was very inferior to that of Europe.

Gunpowder.

The only necessary of life in which the country of the Negroes appears to be extremely deficient is salt, which is the more wanted among them in consequence of their subsisting chiefly upon vegetable food. A child cries for a piece of salt as for a great delicacy; and it is a proverbial expression of a man's riches, to say, that he eats salt to his food. This important article they receive from the great desert by caravans of

trading Moors. They also receive arms, hardware, glasses, and trinkets of all sorts, on the western coast from the Europeans, and, in the interior, from the caravans of Cairo, Fezzan, and Morocco. For these they give in return, gold, ivory, and slaves. With regard to the ivory, the Negroes cannot comprehend for what reason it is so much valued by strangers. It is in vain to tell them that ships are built, and long voyages undertaken, to procure it to make handles for knives. They are satisfied that a piece of wood might serve the purpose as well, and imagine that it is applied to some important use which is concealed from the Negroes, lest they should raise the price of it. The trade of the Negroes is conducted by barter; and to adjust the value of their different articles of commerce, they appeal to a nominal standard, consisting of a certain quantity of any commodity for which there is a great demand. Thus on the Gambia, that quantity of ivory or of gold-dust which is estimated as equal in value to a bar of iron, is denominated a *bar* of ivory, or a *bar* of gold-dust.

Africa. Trade.

Medium of commerce.

A marvellous story has, in all ages, been told of a strange mode of conducting commerce that exists among certain African tribes who live in the wildest mountainous districts: they are said to engage annually in trade, but at the same time to seclude themselves from all personal intercourse with the traders who visit them: They traffic chiefly in gold-dust, which they bring to particular places, and there leave it upon the approach of the traders, who deposit quantities of goods which they are willing to give for the gold-dust, and thereafter retire. The natives then approach and carry off the goods, or the gold-dust, according as they think fit to accept or reject the bargain. From the days of Herodotus down to our own times, this story has been repeated by various writers, and in particular by Wadstrom, upon the authority of the chevalier de la Touch, vice-governor of Goree, in 1788, who is said to have visited the districts inhabited by these invisible traders.

Singular mode of trading.

The knowledge of the Negroes with regard to all speculative subjects, is extremely limited. Their notions of geography and astronomy, like those of other rude nations, are altogether puerile. They regard the earth as a vast plain, the boundaries of which are covered with clouds and darkness. The sea is a great river of salt-water; beyond which is the land of the white people; and at a still greater distance, is the land to which the slaves are carried, which is inhabited by giants, who are cannibals. Eclipses are ascribed to enchantment, or to the interposition of a great cat, which puts its paw between the moon and the earth. They divide the year by moons, and calculate the years by the number of rainy seasons. They seem to believe in one God, who has power over all things; but their religious opinions are extremely undefined, so that it is in vain to expect to find among them any system of belief that is either universally received or even consistently adhered to by the same individuals. They in general seem to think, that the god of the blacks or Negroes is different from the god of the whites: When they are pleased with their own condition and their country, they represent the black deity as a good being, and the white deity as a kind of devil, who sends the white people to make slaves of

Knowledge of the Negroes extremely limited.

Religious opinions.

the

Africa. the Negroes: But when they are in ill humour, they complain of their black deity as mischievous and cruel; while they say that the white deity gives his people the Europeans brandy and fine cloths, and other good things which are denied to the Negroes. Their notions of a future state are of the same fluctuating nature. They have a confused idea that the existence of the human mind does not terminate with this life; and they seem to venerate the spirits of the dead, regarding them as protectors, and placing victuals at the graves of their ancestors upon stated occasions. In general, however, they regard death with great horror; and in Whidah it was a law, that no person, on pain of death, should mention it in presence of the king. Some of them have a notion of a future state as connected with rewards and punishments of their conduct in this life. They imagine that the deceased are conveyed to a mighty river in the interior regions of Africa, where God judges of their past lives, and particularly of the regularity with which they have celebrated the new moons, which among the Negroes are kept as festivals; and of the fidelity with which they have adhered to their oaths. If the judgment is in their favour, they are gently wafted over the great river to a happy country, resembling in description the paradise of Mahomet, where they enjoy plenty of all those things which they were accustomed to value in this world: But if the judgment is unfavourable, they are plunged into the river, and never heard of more. They also believe, like the vulgar of most other countries, that the ghosts of persons who have been guilty of great and unexpiated crimes, find no rest after death, but haunt or wander about those places in which their crimes were committed. The Asiatic doctrine of the transmigration of the souls of men after death into the bodies of other animals, is also entertained by some of them.

Of the creation of man. The opinions of the Negroes concerning the creation of man are not more fixed or definite than their ideas of his future existence. In general, they ascribe his original creation to the deity; but some of them pretend that he emerged, they know not how, from the caves and holes of the earth, or was produced by a monstrous spider. A curious fiction upon this subject is also said to prevail in some of the Negro states;—That God originally created both black men and white men; that he meant to bestow one gift upon each of them, gold or wisdom; that he gave the black men their choice, and that they preferred gold, and left wisdom or ingenuity to the whites; that God was offended with them on account of this improper choice, and ordained them to be slaves for ever to the white men.

Of providence. They also believe in a divine providence which sends rain to give fertility to the earth and the trees, and to wash down gold from the mountains. Accordingly, they pray fervently to God to give them those things upon which they set the greatest value, such as rice and yams, and gold, and slaves, and health, and activity. At the same time, from their inaccuracy of thinking upon this subject, they readily say, when conversed with, that it is not God but the earth that gives them rice; that their cattle produce young without the assistance of God; and that, if they did not labour for themselves, they might starve before God would help them.

Africa. From this loose and inaccurate mode of reasoning the religion of the Negroes fits very light upon them. They seem to have a sort of priests, who perform some ceremonies at the new moons, and on certain occasions, such as, at marriages, or on giving names to young children; but these priests having no settled system of doctrine, and not being united into a disciplined body, possess very little influence. Hence it is extremely easy to induce the Negroes to adopt the religion of any more intelligent people. Accordingly, the Moors have made many converts among them; and some of the most considerable Negro states upon the northern frontier, that is upon the Senegal and the Niger, are Mahometan.

But though the Negroes have little speculative religion, they have much superstition, as appears from the great use which they make of what are called *fetiches*, or charms termed *obi* by the Africans in our West-India islands. The fetiche consists of any natural object, which chances to catch hold of the fancy of a Negro. One selects the tooth of a dog, of a tiger, or of a cat, or the bone of a bird; while another fixes on the head of a goat, a monkey, or parrot, or even upon a piece of red or yellow wood, or a thorn branch. The fetiche thus chosen, becomes to its owner a kind of divinity, which he worships, and from which he expects assistance on all occasions. In honour of his fetiche, it is common for a Negro, to deprive himself of some pleasure, by abstaining from a particular kind of meat or drink. Thus one man eats no goats flesh, another tastes no beef, and a third no brandy or palm wine. By a continual attention to his fetiche, a Negro so far imposes upon himself, as to represent it to his imagination as an intelligent being, or ruling power, inspecting his actions, rewarding his virtues, and punishing his crimes. Hence he covers it up carefully whenever he performs any action that he accounts improper. The importance or value of a fetiche is always estimated according to the success of its owner, and the remarkable prosperity of an individual brings his fetiche so much into fashion, as to induce others to adopt it. On the contrary, when a Negro suffers any great misfortunes, he infallibly attributes it to the weakness of his fetiche, which he relinquishes, and adopts another that he hopes will prove more powerful. A fortunate fetiche is usually adopted by the whole family of its possessor, to which it becomes an object of reverence, or a guardian like the household gods, *dii lares* and *penates*, of the ancient Romans. Sometimes a whole tribe or a large district has its fetiche, which is regarded as a kind of palladium upon which the safety of their country depends. Thus at Acra the national fetiche was a lake, which the people accounted sacred. This lake was converted into a salt pit by the Portuguese, and the natives regarded this profanation as the cause of the conquest of their country by a neighbouring tribe called the *Aquamboans*. Thus also in Whidah, although the people believe in one supreme god, they worship as their national fetiche a kind of serpent of monstrous size, which they call the *grandfather of the snakes*. They say that it formerly deserted some other country, on account of its wickedness, and came to them, bringing good fortune and prosperity along with it. From this account of the fetiches of the Negroes, the intelligent reader will naturally remark that even idolatry itself remains in an

Africa.

imperfect state among the people; and he will observe the difference between the polished superstition of ancient Greece and Rome, and the vulgar and unadorned credulity of these rude and artless tribes. In the vicinity of their settlements, the Moors have prevailed with the illiterate Negroes, to adopt as fetiches or charms, certain sentences of the Koran, which they write out and sell to them, under the name of *saphies*. Mungo Park, when travelling among them, sometimes sold saphies which usually consisted of the Lord's prayer.

Singular customs.

Among the Negroes some singular customs prevail, which are not unworthy of notice, on account of their having some similarity to certain practices that have subsisted among other nations. Persons accused of any crime, more especially of poisoning, are frequently required to prove their innocence, by drinking what is called the *red water*. This is a poisonous liquor formed from the roots of certain plants, and the barks of trees, of a very narcotic quality. The accused is placed on a high chair, and stript of his clothes, having only a quantity of plantain leaves wrapt round his waist. He then, in presence of the whole village, eats a little rice, and drinks about an English gallon of the red water, which is extremely apt to find the accused person guilty. If he escape unhurt, however, and without vomiting, he is judged innocent. Much dancing and singing takes place on account of his escape, and he is allowed to demand that some punishment be inflicted on his accusers on account of the defamation. Among the superstitious customs of the Negroes, may be mentioned the practice of circumcision, which is universal among them. It is not regarded as a religious rite, but as a kind of charm for preventing barrenness. It is not performed till the age of puberty.

Secret societies of men.

In several Negro states certain secret societies or fraternities exist, which possess great political influence, and in some places absolute power. One of these societies, called the society of the *Belli*, is appropriated to men, to the exclusion of women. It supports itself by the use of mystical symbols, a pretence to the knowledge of important secrets, and by subjection to an imaginary being called the *Belli*, who is said to be capable of changing his form at pleasure. This society monopolizes all public offices, to the exclusion of the uninitiated. The young men are introduced into it by a noviciate which lasts some years. A space is marked out of eight or nine miles in circumference in a fertile spot, in which huts are built, and provisions raised. The young men resort thither, and are taught by instructors pitched upon by the society, to fight, to fish, to hunt, and to sing certain songs peculiar to the fraternity; they also receive new names as a mark of their new birth, and certain scars are imprinted upon their bodies, with heated instruments of iron, to point them out as belonging to the fraternity. On returning home after their initiation, they are received with great ceremony by their relations, as persons now introduced into public life.

of women.

There is a kind of counterpart of this association, though of less political importance, called the society of the *Nessoge* or *Sandi*, which is confined to females. In a remote wood, which men are prohibited to approach, a number of huts are constructed, and the young marriageable girls are conducted thither during the night. They remain in this solitude, under the

care of certain matrons during four months, and are taught a variety of religious customs and superstitions. When their noviciate is expired, they return by night to their villages, where they are received by all the women both old and young quite naked, who parade about with them, playing upon some rude musical instruments till daybreak. If any man should approach this procession, he would suffer death, or be compelled to redeem himself by a very heavy fine.

Africa.

There is a third kind of society which is much more universal than those now mentioned, and seems to exist in all the Negro states. This society does not appear to have any special name, but it conducts the mysteries of a strange imaginary being, called *Mumbo Jumbo*. As the practice of polygamy exists very universally among the Negroes, they often find great difficulty in preserving the peace of their families amidst a variety of rival wives. When the husband finds his authority altogether contemned, he has recourse to the assistance of *Mumbo Jumbo*. The dress of this strange minister of justice usually hangs upon a tree in a forest in the neighbourhood of every Negro village. It is made of bark, and forms a figure of about eight or nine feet high, with a tuft of straw on its head. When Mumbo is about to appear he announces his approach in the evening by dismal screams from the adjacent woods, and as soon as it is dark he enters the village and proceeds immediately to the public place, where all the inhabitants both male and female are obliged to assemble at his call; for this phantom has absolute power. Nobody must appear covered in its presence, and every person is bound implicitly to execute its commands. As the women know that the visit is intended against some of them, they can have no great relish for the solemnity, but they dare not refuse to attend. The ceremony commences with songs and dances. These continue till midnight, when Mumbo Jumbo fixes upon the individual on whose account he comes. She is immediately seized by his command, stripped naked, tied to a post, and scourged with Mumbo's rod, to the great entertainment of the whole assembly, and especially of the rest of the women, who are always loudest in their derision and censure of the culprit. The society that conducts the appearances of this mysterious personage make use of a peculiar or cant language which is not understood by the uninitiated. They pretend that Mumbo Jumbo is a wild man, or some strange being that knows every body's thoughts. They bind themselves by oaths never to reveal their secrets to a woman or a boy. The fraternity is so powerful, that when one of the Negro kings was weak enough to reveal the secret of Mumbo Jumbo's character to a favourite wife, who communicated it to the other females of the household, he and his whole family were immediately assassinated, in the presence, and by the command, of Mumbo Jumbo; and nobody dared to dispute the propriety of their punishment.

Like all rude nations, the different tribes of Negroes are implicit believers in witchcraft and magic, and in the existence of various kinds of forcerers. These forcerers they regard with the utmost terror and abhorrence. They believe that some of them have power to controul the seasons, and to prevent the rice from arriving at maturity. Others of them are supposed to

suck

Africa. suck the blood of men and beasts, and to occasion all kinds of diseases. When they suspect a person to have died in consequence of forcery, they interrogate the corpse, which they believe gives answers in the affirmative, by forcibly impelling forward the persons who bear it, and in the negative by a rolling motion. If an answer is given in the affirmative, they inquire concerning the murderer, beginning with the relations of the deceased and naming the suspected persons. When the guilty person is named, they say, that the corpse impels the bearers forward; and upon the authority of this evidence, the person accused is seized and sold into slavery, and sometimes also his whole family. It is evident that a trial of this kind may be so managed, as on all occasions to secure the condemnation of the accused person. Accordingly, in proportion to the demand for slaves, accusations of forcery are more frequently brought forward against their subjects by the Negro chiefs. These accusations, however, are sometimes also brought against persons of importance, who cannot be sold on account of their rank, or against aged persons, whom nobody will purchase. In these cases, the person convicted is compelled to dig his own grave; and being placed at the foot of it, one from behind strikes him a violent blow upon the back of the head or neck, which causes him to fall upon his face into the grave. Some loose earth is then thrown upon him; and a stake of hard wood is driven through his body, and the grave is filled up.

Tenacious of their customs.

Of these and all their other customs, the Negroes are extremely tenacious; and this tenacity of their customs, down to the minutest trifles, forms the principal obstacle to their civilization or improvement. Thus it is the custom to cut the rice, six or eight inches below the ear, by two or three stalks at a time, according as they can be grasped between the thumb of the right hand and a knife, which is held in the same hand. The stalks are leisurely transferred to the left hand, and when it is almost full, they are tied like a nosegay and put into a basket. A Negro chief who had seen the English mode of reaping, said, that it would cost an African his life, should he attempt to introduce it into his country, as he would be accused of intending to overturn the ancient customs, and would be compelled to drink the red water. By means of their customs, also, property is rendered less valuable than in other countries, which operates as a discouragement to industry. Their agriculture is carried on in concert by the inhabitants of every district, who share in common the products of their harvest. Hence the idea of exclusive property is rendered very vague, while the unlimited exercise of the law or custom of hospitality, renders the possession of it uncertain; as the industrious are forced to share their wealth with the indolent. Begging is not reckoned disgraceful; and if a person has been negligent in providing the necessaries of life, he has only to discover where provisions are to be found, and he must obtain a share; for if he enter a house during a repast, the master, by custom, cannot avoid inviting him to partake. As domestic slavery, however, and the traffic in slaves, constitutes a most profitable branch of the African customs, it is not wonderful that their chiefs adhere to them with peculiar obstinacy.

The labours of the field performed in common. Hospitality unlimited.

Encourage indolence.

With regard to the private or domestic economy of

the Negroes, it may be observed, that their houses consist usually of a circular wall, built of mud, or of clay and stone, about four feet high, with a conical roof of bamboos, covered or thatched with hay. As houses of this structure cannot well be divided into separate apartments; where there is a plurality of wives, each has a hut appropriated to herself, and the whole huts belonging to a family are surrounded by a fence of bamboos formed into a kind of wicker work. A number of these enclosures, with intermediate passages or streets, which have no regular arrangement, form a town or village. The furniture of their houses usually consists of a bed, formed of a frame of canes, covered with a bulleek's skin or with a mat, and of one or two wooden stools, and a few wooden dishes and pots for dressing food. The dress of both sexes is formed of cotton cloth; that of the men usually consists of a loose shirt or frock with wide sleeves, together with drawers or trowsers, which reach to the middle of the leg. Some of the Negroes add to these a cap and sandals. The dress of the women consists of two pieces of cloth, each of which is about six feet long, and three feet broad. The one is wrapt round the waist and hangs down to the ankles, and the other is negligently thrown over the shoulders.

Africa. Houses.

Dress.

The state of the women, as among other barbarous nations, is by no means favourable. It is in general accounted altogether unnecessary for a lover to make proposals to his intended bride. She is considered as the property of her father, from whom he purchases her, and to whom he generally pays a price equal to the value of about two slaves. When he has agreed with the parents, therefore, with whom he eats a few nuts to ratify the contract, the proposed bride must give her consent, or remain for ever unmarried; for if she is given to another, the lover is entitled to seize her for a slave. On the day of marriage the bride is conducted with great ceremony to the house of the bridegroom, who must furnish abundance of liquor and refreshments to her attendants. On approaching the house, the bride is covered all over with a robe of white cotton, and is carried on the back of a woman to the house of her husband. She is then placed amidst a circle of matrons, who give her many instructions about her future life. The day is concluded with dances, songs, and feasting, and the validity of the marriage is confirmed by exhibiting tokens of virginity according to the Mosiac law.

Marriages.

A man is allowed to have as many wives as he can afford to purchase, and they are treated in a great measure as slaves, being in general compelled to take the whole charge of the agriculture abroad, as well as of the preparation of food for the family at home. When the husbands, however, are contented with one or two wives, instances of conjugal infidelity are uncommon; but when they have a greater number, they are often under the necessity of overlooking the accidental gallantries of their wives, in consequence of the impossibility of subjecting them to rigid confinement in the simple state of society in which they live. The Negro women suckle their children till they are able to walk, and sometimes till they are three years old, and during that period have no connection with their husbands.

After this account of the Negroes in general, we shall

Particular tribes. Mandingoes. Africa. shall proceed to take notice of some of the more remarkable tribes into which they are divided, and with which we have been made acquainted by the latest travellers. Of these the tribe of *Mandingoes* is the most important. They derive their name from a district in the interior of Africa, called *Manding*. This territory is situated in the most elevated northern tract of the country of the Negroes, near the sources of the rivers Senegal and Gambia, which flow into the Atlantic on the west, and of the Niger, which proceeds towards the east. Kamaliah, which is one of its towns, and was visited by Mr. Park, lies in 12° 46' N. Lat. Though *Manding* is in so high a level, and abounds in gold, it is not mountainous or barren. The tribe that has issued from it, and assumes the name of *Mandingoes*, forms by far the most numerous race of Negroes through the whole western quarter of the continent of Africa. Their territories intermingle in various situations with the possessions of other states, and they even form the bulk of the population where other tribes enjoy the sovereign power. Their language is by far the most universally understood of all the Negro tongues, and it appears to be more polished than any other. The *Mandingoes* are a tall slender race, of a colour moderately black. Their eyes are remarkably small, and they wear their beards. They are more industrious, and engage more extensively in commerce than the other Negroes, so that they are frequently employed as agents in making bargains by persons of other tribes. In the character of travelling merchants, and instructors of youth, they have insinuated themselves into all the Negro countries, where they are distinguished by wearing more regularly than others a red or white cotton cap, and sandals. Some of them who have learned to read and write Arabic, and who profess Mahometanism, erect schools in the Pagan villages, and instruct the youth gratis. They assume a great appearance of sanctity, abstain from strong liquors, and pretend to the power of counteracting magic. Thus they acquire a most extensive influence, and few affairs of importance are transacted without their advice. In almost every district, troops of *Mandingo* merchants are to be met with; and as their intellectual powers are more developed than those of the other Negroes, they have been able to extend their language, as a kind of learned tongue, second only to the Arabic, along the Senegal and the Niger.

Courts of justice. In most of the *Mandingo* towns there are two public buildings; a mosque for public prayers, and what is called the *bentang*; which is a large stage formed of interwoven bamboos erected under a spreading tree. At the *bentang* all public affairs are transacted, and idle persons assenible to smoke tobacco, and hear news. In every village there is a magistrate, who preserves public order, levies the duties on merchants, and presides at the palavers or courts held by the old men, where justice is administered. At these courts civil questions between parties are debated. In the Pagan states the decisions are pronounced according to the customs of their fathers; but where Mahometanism is more generally received, which is usually the case among the *Mandingoes*, the Koran is the rule of judgment, or the *Sbarra*, which contains a digest of Mahometan laws both civil and criminal. Certain Mahometan Negroes, who make the laws of the prophet

Africa. their particular study, are frequently retained in causes, as professional pleaders, and they are said to exhibit great dexterity in perplexing the judges.

Religion. The Pagan *Mandingoes* believe in one God, the creator of all things; but they consider him as of a nature too much exalted above human affairs, to give much attention to their prayers. They address him, however, at the new moons, and imagine every new moon to be a new creation. They fancy that certain subordinate spirits rule the world, and that these spirits are influenced by enchantments and fetiches. They believe in a future state, but most of them admit that they know nothing about it. Their funerals consist of a tumultuous procession, in which they make dismal howlings; and after burying the body beside some large tree, the solemnity terminates in a revel of drinking, and at last of dancing and singing.

Features. Next to the *Mandingoes*, the *Foulahs* are the most numerous race of Negroes on the western quarter of the continent of Africa. Their original country is called *Fooladoo*. It is a small state, situated near the sources of the Senegal and the Niger. From thence they have emigrated in powerful clans, and have acquired extensive territories, especially along these rivers, and along the Gambia. The *Foulahs* also possess the sovereignty of various insulated tracts southward, towards Sierra Leona. Besides the fixed settlements in which they enjoy the sovereignty, they have introduced themselves in many places along the banks of the Gambia, and to the southward along what is called the gulf of Guinea, to a great distance, into the greater part of the Negro states, in the character of shepherds and cultivators of the ground. They obtain admission by paying a tax or rent to the chiefs of the territory for whatever lands they occupy, and emigrate at pleasure. In consequence of this mode of life, the sovereignty frequently fluctuates in the small states, between them and the *Mandingoes*, and other tribes, according to the proportion of the population, which often alters, from the emigrations of the *Foulahs*.

Character. The features of the *Foulahs* are very different from those of the other Negroes. They have a Roman nose, a thin face, and small features, with long glossy soft hair, so as to resemble in a great degree the East Indian Lascars. Their complexion is by no means of the permanent jetty colour of the other Negroes, but varies with the districts they inhabit, approaching to yellow in the vicinity of the Moors, and deepening into a moderate black towards the equator. Their stature is of the middle size, their form graceful, and their air insinuating. Their women are well shaped, and have regular features; but neither men nor women are so robust in their make as the other Negroes. Hence, they are accounted by the Negroes an intermediate race between themselves and the Moors; but the *Foulahs* consider themselves as superior to the Negroes, and class themselves among white nations. Their natural disposition is mild and humane, and they are extremely hospitable where the Mahometan religion has not taught them to treat infidels with reserve. They support with great care the aged and infirm of their own tribe, and frequently relieve the necessities of persons of others tribes. There are few instances of one *Foulah* being insulted by another, and they never sell their countrymen for slaves; on the contrary, if a *Foulah*

Africa. Foulah have the misfortune to be enslaved, his whole clan or village contributes to pay his ransom.

Occupations.

The Foulahs engage more extensively than the other Negroes in the raising of corn, and the breeding of cattle, but especially in the latter occupation. Hence, the Mandingoes frequently entrust their cattle to the care of the Foulahs. They render them tractable by familiarity; feed them by day in the woods and open meadows, and secure them by night in folds, which they fence very strongly. Not satisfied with this precaution, the herdsmen, whose huts are erected in the middle of the fold, keep fires during the night burning around the folds, for the protection of the cattle against wild beasts, and to show that they are in a state of preparation against robbers. From the necessity of guarding their cattle they become intrepid hunters, and kill lions, tigers, elephants, and other wild beasts, with poisoned arrows, or with muskets which they purchase from the whites upon the coast. To poison their arrows, they boil the leaves of a particular shrub in water, and dip in the black juice a cotton thread, which they fasten round the barbs of the arrow.

From the milk of their cattle the Foulahs make considerable quantities of butter; but like all the Negro nations, they are entirely ignorant of the art of preserving milk by making it into cheese. This art is probably prevented from being introduced by the heat of the climate, and by the extreme scarcity of salt, which can be obtained in no other way but by purchasing it from the sea coast, or from caravans of trading Arabs, who bring it on the backs of camels from the great desert. They entertain a singular superstition, that to boil the milk of a cow prevents her from having any more. Hence, they will sell no milk to any person whom they have once discovered to have boiled it.

Amusements.

Like the other Negro tribes, the Foulahs are excessively fond of dancing. They have also a strong passion for music, and their chiefs account a practical skill in it a most respectable accomplishment. Their national airs have a peculiar character, and are tender and pleasing.

Though the Foulahs do not enslave each other, they do not hesitate to make war upon the neighbouring tribes for the purpose of obtaining slaves, chiefly with a view of selling them to the Europeans upon the coast for fire-arms and gunpowder. Such at least is the account of the matter, which was obtained in 1794 by Messrs Watt and Winterburn, who visited Fouta-jallo, an extensive Foulah kingdom in the interior of Sierra Leona. This kingdom extends about 300 miles from east to west, and 200 from north to south. Temboo, the capital, contains 7000 inhabitants. The power of their king is in a great measure arbitrary. On an emergency, he can bring to the field 16,000 cavalry. The markets and all kinds of trade are regulated by him and his officers. The soil is in many places extremely fertile, producing rice and maize, which are cultivated by the women, and carried to market by the men. In general, however, the ground is dry and stony, but affords pasture for all kinds of cattle. Their women dig a species of iron stone from mines of considerable depth. The ore is afterwards manufactured into a very malleable metal. In this kingdom of Fouta-jallo there are schools in every

town; and the majority of the people can read. The Mahometan religion is professed, but the mild character of the Foulahs prevents it from exhibiting that aspect of intolerance towards strangers which characterizes the professors of this religion in other countries.

On the western coast, a great part of the district between the rivers Senegal and Gambia, or, as it is often called, *Senegambia*, is inhabited by a nation called the *Jaloffs*, which differs considerably from the other tribes of the Negroes. Their stature is tall and robust, and, though their complexion is of the deepest black, their noses are not so much depressed, nor their lips so protuberant, as those of the Mandingoes. They excel their neighbours in the manufacture and dying of cotton cloth, which they form of a finer thread and a broader web. They use their toes with the same dexterity as their fingers in many operations. Hence when they perceive a pair of scissars, a knife, or a toy which they covet, they turn their backs upon it, and, having engaged the owner in conversation, they seize it artfully with their toes, and throw it into a pouch which they wear behind. In this way, strangers trading in their towns are amazed to find their goods vanishing before their eyes, while they cannot perceive the thief. The Jaloffs are very warlike, and equal the Moors in the management of horses; but, as they are divided into a variety of petty states, which are continually engaged in war with each other, they have little power as a nation. In the succession to their leaders or chiefs, they follow the female line as the surest; and therefore, the eldest son of the eldest sister of the chief is preferred.

On the coast to the south of the river Gambia, there exists a rude but industrious tribe, called the *Feloops*, who have little intercourse with their neighbours. They possess considerable energy of character, and have resisted successfully the attacks of the Mandingoes, even when assisted by the Portuguese. They are very faithful in friendship, and their enmity is equally permanent, as they transmit their family feuds from generation to generation. When a man is killed in a quarrel, his eldest son procures his sandals, which he wears on the anniversary of the murder of his father, till he can revenge his death. In those parts of their country in which the Europeans have committed any ravages, they give no quarter to a white man. They sell to the Europeans, however, rice, goats, poultry, wax, and honey.

Besides these, a variety of tribes inhabit the same coast, and are known to Europeans under the appellation of *Nallos*, *Biafaras*, *Bissagoes*, *Balantes*, *Papels*, and *Banyans*, of whom it is unnecessary to take particular notice, as they appear to be distinguished by no peculiarity from the other Negro tribes.

Proceeding eastward in the country between the Senegal and the Gambia is *Bambouk*, a region of considerable extent. The natives were originally termed *Malinkups*; but, by intermingling with the Mandingoes, they have gradually so much assimilated to that people, as to lose the character of a distinct tribe. The country is mountainous, but is unwholesome and full of minerals. It abounds in mines of gold, silver, copper, tin, and iron, but is neither well suited for agriculture nor for pasturage. The working of the mines is regulated by the caprice or the wants of the chiefs.

Mines of gold, &c.

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chiefs of the different districts. The miners are indolent and unskilful: They never penetrate beyond 10 feet in depth, though the quantity of gold increases with the depth of the mine. They regard gold as a capricious and malevolent being, who delights in deluding the miners; on which account they never attempt to recover a vein when it disappears. The government of Bambouk fluctuates, like that of many of the Negro states, between monarchy and aristocracy, and the power of the king or supreme chief is extremely limited.

The frontiers of the Negro kingdoms usually consist of a wild or desert tract. Thus the kingdom of Woilli, which is on the north-west of Bambouk, is separated on its eastern boundary, by a wilderness filled with wild beasts, from the kingdom of Bondou, which lies to the north of Bambouk. Fattecondi is the capital of Bondou, at which the king resides. The king caused Major Houghton, an English traveller employed by the African Association, to be plundered; and he begged from Mr Mungo Park his blue coat, which that traveller was under the necessity of giving him, to avoid bad usage. His revenues, however, are considerable. His authority is firmly established, and his power is formidable to his neighbours. He was so well pleased with obtaining Mr Park's blue coat, adorned as it was with yellow buttons, that, on the following day he presented to him somewhat more than half an ounce of gold, exempted his baggage from examination by the tax-gatherers, and allowed him to pay a visit to the women of his seraglio. The country at large is covered with wood, and, as it is in an elevated situation, and consequently somewhat less exposed than elsewhere to the burning heat of the climate, it is abundantly fertile. The frontier town of the kingdom eastward is called *Jag*. It contains 2000 inhabitants, is surrounded by a high wall with holes for muskets, and is in $14^{\circ} 25'$ N. Lat. and $9^{\circ} 12'$ W. Long.

To the north-east of Bondou is the Mandingo kingdom of Kasson, in which this peculiar custom or superstition prevails, that no woman is allowed to eat an egg. Kooniakary, the capital, lies in N. Lat. $14^{\circ} 34'$, about $59\frac{1}{2}$ geographical miles to the east of *Jag*. To the south-east of Kasson is the kingdom of Kaarta, which is bordered on the east by Bambara, between which and Kaarta there are very frequent wars; a circumstance which renders travelling through these and other Negro states not a little difficult. The people are industrious: The cultivation of corn is carried on to a great extent, especially in Bambara. They are Mahometans, without the intolerant fanaticism of that religion; and accordingly, they are hospitable to strangers, though of a different faith. The neighbourhood of the Moors, however, renders the country unsafe; and, to guard against their incursions, the Negroes, when employed in agriculture, are under the necessity of carrying their arms to the field.

Sego.

Sego, the capital of Bambara, lies in N. Lat. $14^{\circ} 10'$, and W. Long. $2^{\circ} 26'$; and contains about 30,000 inhabitants. It was here that Mungo Park at last beheld the long-sought majestic river Niger glittering to the morning sun, as broad as the Thames at Westminster, and flowing slowly from west to east. This river is here called the *Joliba* by the natives. From the times of the Nafamonian explorers prior to the days of He-

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rodotus, during 2300 years, no certain intelligence concerning this river had been obtained by the European nations, and its very existence had been doubted by the most intelligent writers. Mr Park is the only European traveller who since that period can boast of having reached it. Segó consists of four distinct towns; two of which are on the north and two on the southern part of the Niger. They are surrounded by high mud walls. The houses are of a square form; they are built of clay, and have flat roofs. The streets are narrow; and, as the Moors form a considerable proportion of the inhabitants, their mosques appear in every quarter. The language, however, is a dialect of the Mandingo. The authority of the Negro king of Bambara is not a little restrained here by the influence of the Moors; and, to avoid giving offence to their intolerant spirit, he was under the necessity of sending Mr Park immediately out of the city to a village in the neighbourhood. The weather was stormy, but some Negro women conducted him into a hut, gave him food, and thereafter began to their accustomed labour of spinning cotton. During their work they amused themselves with a song, composed upon the occasion, which one of them sung to a plaintive air. The translation of the song is in these terms: "The wind roared and the rains fell; the poor white man, faint and weary, came and sat under our tree. He has no mother to bring him milk, no wife to grind his corn. *Chorus*. Let us pity the white man, no mother has he," &c.

The current money of this place consists of cowries, a kind of shells (*Cypræa moneta* Lin.) which are also employed in the same way in Bengal. A man and his horse can subsist during 24 hours upon the provisions that 100 of them will purchase. The king of Bambara presented Mr Park with 5000 cowries, and desired him to leave the neighbourhood of his capital, that he might not be destroyed by the Moors. This traveller persevered in advancing eastward down the river to another town called *Silla*, situated in N. Lat. $14^{\circ} 48'$, *Silla*, and W. Long. $1^{\circ} 24'$, about 1090 British miles east of Cape Verd. This formed the utmost limit to which he was able to advance, and therefore remains the boundary of our certain knowledge of the countries in that direction. He learned, however, that *Silla* stands within 200 miles of the city of Tombuctoo, which is upon the same river, and had long been an object of search of the Portuguese, the French, and English. He was informed, that the country is very populous in that direction. He was also told, that about two days journey below *Silla*, where he stopped, there is a larger town than Segó called *Jenné*, which stands on a small island in the Niger; and that two days journey below *Jenné*, the river expands into a large lake called *Dibbie*, from which the water issues in two large branches, insulating a fertile and swampy country called *Ginbala*; and that the two great branches of the river reunite at *Kabra*, which is one day's journey to the south of the city of Tombuctoo, of which it is the port. The government of Tombuctoo is said to be in the hands of the Moors; and that place is the principal emporium of the Moorish commerce in Africa. Below Tombuctoo, to the eastward, is the Negro city of Houssa, the capital of a great kingdom, and possessed of extensive commerce. The Niger passes to the south of Houssa at the distance of two days journey; but Mr Park

Africa. Park could learn nothing further concerning its course, as the traders who arrive at Tombuctoo and Houssa from the coast can say nothing more of it, than that *it runs towards the rising of the sun to the end of the world.* Any farther intelligence that has hitherto been obtained, concerning Soudan or Nigritia to the eastward of the route of Mr Park, is extremely uncertain, being merely the result of inquiries made by Mr Horneman among the merchants of Fezzan during his residence there. In the present imperfect state of our knowledge, however, this information is entitled to attention. He observes, that "the Houssa are certainly Negroes, but not quite black; they are the most intelligent people in the interior of Africa; they are distinguished from their neighbours by an interesting countenance; their nose is small and not flattened; and their stature is not so disagreeable as that of the Negroes, and they have an extraordinary inclination for pleasure, dancing, and singing. Their character is benevolent and mild. Industry and art, and the cultivation of the natural productions of the land, prevail in their country; and in this respect they excel the Fezzanians, who get the greatest part of their clothes and household implements from the Soudanians. They can dye in this country any colours but scarlet. The culture of their land is as perfect as that of the Europeans, although the manner of doing it is very troublesome. In short, says Mr Horneman, we have very unjust ideas of this people, not only with respect to their cultivation and natural abilities, but also of their strength and the extent of their possessions, which are by no means so considerable as they have been represented. Their music is imperfect, compared to the European; but the Houssian women have skill enough to affect their husbands thereby even to weeping; and to inflame their courage to the greatest fury against their enemies. The public singers are called *Kadanka.*"

Bornou. The same traveller informs us, that to the eastward of Houssa are situated the dominions of the sultan of Bornou. The people are blacker than the Houssians, and completely Negroes. They are strong, patient of labour, and phlegmatic. Their food is a paste made of flour and flesh, and their liquor is an intoxicating, but nourishing kind of beer. Their best natural production is copper. The low country of Wangara is said to be subject to Bornou. It is periodically overflowed by the Niger; but the course of that river farther eastward is not known. Mr Horneman was informed that it has at least a periodical communication with the longer branch of the Nile, called the *Bahr Abiad* or White river, which rises in the mountains Al Komri, or mountains of the Moon, about the seventh degree of N. Lat.

Darfoor. To the eastward of Wangara, at the distance of about six degrees of longitude is the country of Darfoor already mentioned; beyond which lies Kordafan, another barbarous state; and still farther to the eastward is the country of Abyssinia, in which the shorter branch of the Nile, the *Bahr Azrac* or Blue river, takes its rise, which was visited and traced to its source by our countryman Mr Bruce. That traveller considered the Bahr Azrac as the Nile, whereas in truth it is only one of its tributary streams.

The belt or stripe of territory of which we have hitherto taken notice is situated between the 10th and

17th degrees of N. Lat. To the southward of this line the interior of Africa is still unknown, as it has hitherto been visited by no European traveller. We only know that it contains various nations or tribes of Negroes, of different characters and degrees of civilization. It may be observed, however, that to the south of Tombuctoo and Houssa lies the kingdom of Gago, near a ridge of mountains which run from west to east, and give rise to many streams that flow northward into the Niger. It produces much gold, and the people are warlike. Their armies are composed of cavalry; and no warrior is permitted to take an enemy prisoner before he has obtained, by the mutilation of persons whom he has slain, an hundred bloody trophies, similar to those which, in the Jewish history, David is said to have won from the Philistines and presented to King Saul as the price of his daughter Michal (1 Samuel xviii. 25.) In Gago, when the general takes the field he spreads a buffalo's hide upon the ground; and, pitching a spear at each side, he causes the soldiers to march over it till a hole be worn through the hide, when the army is understood to be sufficiently numerous. The king is absolute; but, when they are offended with his conduct, his subjects sometimes rebel and send him a present of parrots eggs, with a message, importing that "his subjects, considering that he must be fatigued with the trouble of government, are of opinion that it is time for him to indulge in a little sleep." If the rebellion appear too formidable to be resisted, his majesty takes the hint, and desires his women to strangle him; upon which he is immediately succeeded by his son.

To the south of Gago, and near to the gulf of Guinea, **Dahomy.** is the kingdom of Dahomy. The capital, called Abomy, stands in N. Lat. 7° 59'. The country is fertile and cultivated, bearing every kind of grain, as well as indigo, cotton, and sugar. The character of the people is strongly marked, and some of their customs are singular. In their wars they are bold, and even ferocious; but towards strangers they are hospitable, without any mixture of rudeness. Their king possesses absolute power in the most complete sense of the word. All children, whether male or female, are considered as his property. They are early separated from their parents, and receive a sort of public education, with a view to destroy from their minds all family connections. The king's dwelling occupies a space of about a mile square. It consists of a multitude of huts formed of mud walls with bamboo roofs; and the whole is enclosed by a mud wall of 20 feet in height. The entrance of the king's apartment is paved with human skulls and the side walls are ornamented with the jaw bones of men. On the thatched roofs numerous human skulls are ranged on wooden stakes; and he declares war by announcing that his house wants thatch. He has commonly about 3000 females immured in this dwelling; and about 500 are appropriated to each of the principal officers. When a man wants a wife he must purchase her from the king or some of these officers. He must first lay down the price, which is 20,000 cowries; and must then be contented with the wife that is allotted to him. At his accession the king proclaims that he knows nobody, and is not inclined to make any new acquaintance; that he will administer justice rigorously and impartially, but will listen to no representations against his will; and that he will receive no presents except from his officers, who approach him

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with the most abject submission. His whole subjects acknowledge themselves his slaves, and admit his right to the absolute disposal of their property and persons. Their character is nevertheless active and intrepid; and they sacrifice themselves in war without hesitation, in obedience to his commands. Thus the Dahomans appear to form a sort of exception to the general mildness of the Negro character.

In addition to what has been here stated concerning the black inhabitants of the southern regions of Africa, it may be remarked, that a French traveller, Vaillant, proceeding northward from the Cape of Good Hope, has made repeated efforts to investigate the character and state of the natives in that quarter. He has extended his researches into what is called the *country of the Caffres*, far beyond the limits that had been reached by any other traveller, and has given us the names of various African tribes under the appellation of *Ghessequas, Nimitquas, Koraquas, Kahobiquas, and Houzouanas*. These tribes differ considerably in their features and make of body from the general Negro race, which we have already described. In their moral and intellectual character, however, they are not a little inferior: Their wants are extremely few, and are supplied by their flocks and herds without the necessity of agriculture; and their lives pass away in a routine of listless inactivity, or of simple and uninteresting occupations, the detail of which would afford little amusement or instruction.

European establishments.

We have already mentioned, that the European nations, during these three last centuries, have established small settlements or garrisons upon different parts of the Negro coast, chiefly for the purpose of obtaining slaves by trading with the natives. The number of people that are annually exported from that country, in consequence of this trade, by Europeans or Moors is very great. The Europeans have frequently carried from the west coast above 100,000 slaves a-year; and the caravans of Egypt and Fezzan carry off about 20,000 annually. The very great extent to which this traffic is carried on the western coast, undoubtedly gives rise to many abuses among the native states in that neighbourhood, and is productive of frequent wars among them. Unfortunately, the nations of Europe have hitherto made few efforts to compensate these evils by any attempts to introduce their arts, their civilization, or their science, among the natives. Till lately, the Portuguese were the only nation that attempted the improvement of the Negroes. They did not confine themselves to garrisons or trading factories, but formed considerable colonies on the coasts. They attempted to instruct the natives in the better cultivation of their soil; and introduced their own religion among them. It is even said, that in Loango, Congo, Angola, and Benguela, they have been so sedulous in the conversion of the Negroes, that they have made them better Christians than themselves. It is worthy of notice, as a fact of some importance in natural history, that such of the descendants of the Portuguese in these climates as have adopted the manners of the Negroes, and their modes of life, are hardly to be distinguished in colour from the darkest Negroes. From the weakness of the parent state, the Portuguese settlements, in many places, are greatly decayed; and their efforts for the civilization of the natives have

Slave-trade.

not been sufficiently extensive or persevering: Still, however, they are said to carry on the slave-trade with more mildness and humanity than other nations. The slaves are catechised and baptized before they are shipped; which tends to diminish the terrors attending transportation. The slave-ships of the Portuguese are never crowded, and they are chiefly navigated by black mariners.

Africa.

In 1779, a Swedish society formed the project of settling a European colony on the western coast of Africa, with the view of disseminating the general principles of civilization. This project was, at a later period, eagerly pressed by Charles Berns Wadstrom, a native of that country, but without success. Afterwards the Danes established a small colony with the same view, near the mouth of the river Volta, under the superintendance of Doctor Hert. In the mean time, the university of Cambridge in England, in 1785, proposed, as the subject of a prize-essay, a question concerning the lawfulness of the slavery and commerce of the human species. The prize was won by Mr J. Clarkson; and the question began to attract public notice: Vast numbers of pamphlets were written; and in a few years the whole nation interested itself in the subject, and the slave-trade became an object of popular indignation. Some legislative attempts were made towards its abolition, which were probably frustrated by the convulsed state into which Europe was plunged by the French revolution. In the mean time, as early as 1783, Doctor H. Smeathman had proposed a specific plan for the colonization of Africa. This plan was not immediately attended to; but in the year 1787, after the subject had assumed a greater degree of importance, an attempt was made to carry it into execution, by sending about four hundred blacks and sixty whites, chiefly people of abandoned characters, collected about London, to Sierra Leona. In consequence of the kind of persons chosen as colonists, this first attempt did not succeed. But in July 1791, a number of persons who had contributed money for the purpose of making a settlement with a view to the instruction and civilization of the Africans, were incorporated by act of parliament under the name of the *Sierra Leona Company*. At the termination of the American war, many black loyalists had been conveyed to Nova Scotia, which they disliked, in consequence of the sterility of the lands allotted to them, and the severity of the climate. The new Sierra Leona Company made proposals to these blacks to form a settlement upon the coast of Africa, to which they were to be conveyed at the expence of the Company. The proposal was accepted by 1200 blacks, who arrived at Sierra Leona in March 1792. After experiencing considerable difficulties, the colony began to enjoy tolerable prosperity, and received ambassadors from the neighbouring Negro states; but on the 28th September 1794 a French squadron suddenly plundered and destroyed the colonial town. This squadron had been fitted out for the purpose of disturbing the trade of the English slave-factories on the coast, and is said to have been instigated by an American slave captain, who had taken some offence at the governor, to make the attack now mentioned. The damage was repaired. The settlement has since been visited by various missionaries from different religious sects in Britain, with

Sierra Leona.

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Africa
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Afwestad.

the view of extending the Christian religion. The colony, however, still languishes. It has been engaged in some unfortunate contests with the natives; and it has lately been found necessary to assist the Company with the public money. It seems doubtful how far it is likely ever to fulfil the purpose for which it was instituted, chiefly in consequence of the difficulty of maintaining a very steady intercourse with the country which founded it, and from the unfavourable nature of the climate to the health of the natives of Europe. Without such an intercourse, it is nearly impossible for any infant colony to preserve its own civilization, and much less to confer it upon others. The first colonists, from the necessity of engaging in agriculture, soon forget the arts and the sciences of the parent state; and unless new settlers, from time to time, revive among them, and keep up the improvements of their ancestors, the whole settlement is apt to sink into a semibarbarous state, or into a resemblance of the natives of the country into which they have come. This has been the fate of most of the Portuguese colonies that were intended for the civilization of the Africans; and must prove the destiny of our own settlement of Sierra Leona, unless the ordinary course of events shall be counteracted by extraordinary efforts.

AFRICAN COMPANY. See COMPANY.

AFRICAN Association. See ASSOCIATION.

AFRICANUS, JULIUS, an excellent historian of the third century, the author of a chronicle which was greatly esteemed, and in which he reckons 5500 years from the creation of the world to Julius Cæsar. This work, of which we have now no more than what is to be found in Eusebius, ended at the 221st year of the vulgar æra. Africanus also wrote a letter to Origen on the history of Susanna, which he reckoned supposititious: and we have still a letter of his to Aristides, in which he reconciles the seeming contradictions in the two genealogies of Christ recorded by St Matthew and St Luke.

AFSLAGERS, persons appointed by the burgo-masters of Amsterdam to preside over the public sales made in that city. They must always have a clerk of the secretary's office with them, to take an account of the sale. They correspond to our brokers, or auctioneers.

AFT, in the sea language, the same with ABAFT.

AFTERBIRTH, in *Midwifery*, signifies the membranes which surround the infant in the womb, generally called the secundines. See MIDWIFERY.

AFTERMATH, in *Husbandry*, signifies the grass which springs or grows up after mowing.

AFTERNOON, the latter half of the artificial day, or that space between noon and night.

AFTER-PAINS, in *Midwifery*, excessive pains felt in the groin, loins, &c. after the woman is delivered.

AFTER-SWARMS, in the management of bees, are those which leave the hive some time after the first has swarmed. See BEE.

AFWESTAD, a large copper-work belonging to the crown of Sweden, which lies on the Dala, in the province of Dalecarlia, in Sweden. It looks like a town, and has its own church. Here they make copper plates; and have a mint for small silver coin, as well as a royal post-house. W. Long. 14. 10. N. Lat. 58. 10.

AGA, in the *Turkish Language*, signifies a great lord or commander. Hence the aga of the janizaries is the commander in chief of that corps; as the general of horse is denominated *spahiclar aga*. The aga of the janizaries is an officer of great importance. He is the only person who is allowed to appear before the Grand Signior without his arms across his breast in the posture of a slave. Eunuchs at Constantinople are in possession of most of the principal posts of the seraglio: The title *aga* is given to them all, whether in employment or out. This title is also given to all rich men without employ, and especially to wealthy landholders.

We find also *agas* in other countries. The chief officers under the khan of Tartary are called by this name. And among the Algerines, we read of *agas*, chosen from among the *boluk bashis* (the first rank of military officers), and sent to govern in the chief towns and garrisons of that state. The *aga* of Algiers is the president of the divan, or senate. For some years, the *aga* was the supreme officer; and governed the state in the place of bashaw, whose power dwindled to a shadow. But the soldiery rising against the *boluk bashis*, or *agas*, massacred most of them, and transferred the sovereign power to the caliph, with the title of *Dey* or King.

AGADES, a kingdom and city of Negroland in Africa. It lies nearly under the tropic of Cancer, between Gubur and Cano. The town stands on a river that falls into the Niger; it is walled, and the king's palace is in the midst of it. The king has a retinue, who serve as a guard. The inhabitants are not so black as other Negroes, and consist of merchants and artificers. Those that inhabit the fields are shepherds or herdsmen, whose cottages are made of boughs, and are carried about from place to place on the backs of oxen. They are fixed on the spot of ground where they intend to feed their cattle. The houses in the city are stately, and built after the Barbary fashion. This kingdom was, and may be still, tributary to the king of Tombuctoo. It is well watered; and there is great plenty of grass, cattle, fenna, and manna. The prevailing religion is the Mahometan, but it is not rigidly practised. N. Lat. 26. 10. E. Long. 9. 10.

AGALLOCHUM, a very fragrant medicinal wood brought from the East Indies. See EXCÆCARIA, BOTANY Index.

AGALMATA, in *Antiquity*, a term originally used to signify any kind of ornaments in a temple; but afterwards for the statues only, which were most conspicuous.

AGAMEMNON, the son of Atreus by Erope, was captain general of the Trojan expedition. It was foretold to him by Cassandra, that his wife Clytemnestra would be his death: yet he returned to her; and accordingly was slain by Ægisthus, who had gained upon his wife in his absence, and by her means got the government into his own hands.

AGAN, in *Geography*, one of the Ladrone islands. The circumnavigator, Magellan, was assassinated here in the year 1525.

AGANIPPIDES, in *Ancient Poetry*, a designation given to the Muses, from a fountain of Mount Helicon, called *Aganippe*.

AGANIPPE, in *Antiquity*, a fountain of Beotia, at

Agape
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Agard.

at Mount Helicon, on the borders between Phocis and Bœotia, sacred to the Muses, and running into the river Permessus; (Pliny, Pausanias.) Ovid seems to make *Aganippe* and *Hippocrene* the same. Selinus more truly distinguishes them, and ascribes the blending them to poetical license.

AGAPE, in *Ecclesiastical History*, the love-feast, or feast of charity, in use among the primitive Christians; when a liberal contribution was made by the rich to feed the poor. The word is Greek, and signifies *love*. St Chrysostom gives the following account of this feast, which he derives from the apostolical practice. He says, "The first Christians had all things in common, as we read in the Acts of the Apostles; but when that equality of possessions ceased, as it did even in the Apostles time, the *agape*, or love-feast, was substituted in the room of it. Upon certain days, after partaking of the Lord's supper, they met at a common feast; the rich bringing provisions, and the poor who had nothing being invited." It was always attended with receiving the holy sacrament; but there is some difference between the ancient and modern interpreters as to the circumstance of time, viz. whether this feast was held before or after the communion. St Chrysostom is of the latter opinion; the learned Dr Cave of the former.—These love-feasts, during the three first centuries, were held in the church without scandal or offence; but, in after times, the heathens began to tax them with impurity. This gave occasion to a reformation of these *agape*. The kiss of charity, with which the ceremony used to end, was no longer given between different sexes; and it was expressly forbidden to have any beds or couches, for the conveniency of those who should be disposed to eat more at their ease. Notwithstanding these precautions, the abuses committed in them became so notorious, that the holding of them (in churches at least) was solemnly condemned, at the council of Carthage, in the year 307.

AGAPETÆ, in *Ecclesiastical History*, a name given to certain virgins and widows, who, in the ancient church, associated themselves with, and attended on, ecclesiastics, out of a motive of piety and charity.

In the primitive days there were women instituted DEACONESSES; who, devoting themselves to the service of the church, took up their abode with the ministers, and assisted them in their functions. In the fervour of the primitive piety, there was nothing scandalous in these societies: but they afterwards degenerated into libertinism; insomuch, that St Jerome asks, with indignation, *unde agapetarum pestis in ecclesiis introiit?* This gave occasion to councils to suppress them.—St Athanasius mentions a priest, named Leontius, who, to remove all occasion of suspicion, offered to mutilate himself, to preserve his beloved companion.

AGARD, ARTHUR, a learned English antiquarian, born at Toston in Derbyshire in the year 1540. His fondness for English antiquities induced him to make many large collections; and his office as deputy chamberlain of the exchequer, which he held 45 years, gave him great opportunities of acquiring skill in that study. Similarity of taste brought him acquainted with Sir Robert Cotton, and other learned men, who associated themselves under the name of *The Society of Antiquarians*, of which society Mr Agard was a conspicuous member. He made the *Doomsday* book his peculiar

study; and composed a work purposely to explain it, under the title of *Tractatus de usu et obscurioribus verbis libri de Domesday*: he also compiled a book for the service of his successors in office, which he deposited with the officers of the king's receipt, as a proper index for succeeding officers. All the rest of his collections, containing at least twenty volumes, he bequeathed to Sir Robert Cotton; and died in 1615.

AGARIC, FEMALE. See BOLETUS, BOTANY Index.

AGARIC, *Mineral*, a marly earth, resembling the vegetable of that name in colour and texture. It is found in the fissures of rocks, and on the roofs of caverns; and is sometimes used as an astringent in fluxes, hemorrhagies, &c.

AGARICUS, MUSHROOM. See AGARICUS, BOTANY Index.

AGATE, or ACHAT, (among the Greeks and Latins, *Achatas*, and *Achates*, from a river in Sicily, on the banks of which it was first found), a very extensive genus of the semipellucid gems.

These stones are variegated with veins and clouds, but have no zones like those of the onyx. They are composed of crystal debased by a large quantity of earth, and not formed, either by repeated incrustations round a central nucleus, or made up of plates laid evenly on one another; but are merely the effect of one simple concretion, and variegated only by the disposition given by the fluid they were formed in to their differently coloured veins or matters.

Agates are arranged according to the different colours of their ground. Of those with a *white* ground there are three species. (1.) The *dendrachates*, *mocca* stone, or *arborescent agate*. This seems to be the same with what some authors call the *achates* with rosemary in the middle, and others *achates* with little branches of black leaves. (2.) The *dull milky-looking agate*. This, though greatly inferior to the former, is yet a very beautiful stone. It is common on the shores of rivers in the East Indies, and also in Germany and some other parts of Europe. Our lapidaries cut it into counters for card-playing, and other toys of small value. (3.) The *lead-coloured agate*, called the *phassa-chates* by the ancients.

Of the agates with a *reddish* ground there are four species. (1.) An impure one of a flesh-coloured white, which is but of little beauty in comparison with other agates. The admixture of flesh-colour is but very slight; and it is often found without any clouds, veins, or other variegations; but sometimes it is prettily veined or variegated with spots of irregular figures, having fringed edges. It is found in Germany, Italy, and some other parts of Europe; and is wrought into toys of small value, and often into the German gun-flints. It has been sometimes found with evident specimens of the perfect mosses bedded deep in it. (2.) That of a pure blood colour, called *hemachates*, or the *bloody agate*, by the ancients. (3.) The clouded and spotted agate, of a pale flesh colour, called by the ancients the *cornelian achates* or *sardachates*. (4.) The red-lead coloured one, variegated with yellow, called the *coral agate*, or *coralla-achates*, by the ancients.

Of the agates with a *yellowish* ground there are only two known species; the one of the colour of yellow wax, called *cerachates* by the ancients; the other a

Agaric
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Agate.

very

Agate. very elegant stone, of a yellow ground, variegated with white, black, and green, called the *leonina*, and *leonteseres*, by the ancients.

Lastly, Of the agates with a *greenish* ground, there is only one known species, called by the ancients *jaspachates*.

Of all these species there are a great many varieties; some of them having upon them natural representations of men and different kinds of animals, &c. These representations are not confined to the agates whose ground is of any particular colour, but are occasionally found on all the different species. Velschius had in his custody a flesh-coloured agate, on one side of which appeared a half-moon in great perfection, represented by a milky semicircle; on the other side, the phases of *vesper*, or the evening star: whence he denominated it an *aphrodisian agate*. An agate is mentioned by Kircher *

* *Ephem. German.*
dec. i. an. 1.
obl. 151.

† *De gem.*
l. ii. c. 95.

† *Pliny*
l. xxxvii.
c. 3.

on which was the representation of a heroine armed; and one in the church of St Mark in Venice has the representation of a king's head adorned with a diadem. On another, in the museum of the prince of Gonzaga, was represented the body of a man with all his clothes in a running posture. A still more curious one is mentioned by De Boot †, wherein appears a circle struck in brown, as exactly as if done with a pair of compasses, and in the middle of the circle the exact figure of a bishop with a mitre on: but inverting the stone a little, another figure appears; and if it is turned yet further, two others appear, the one of a man, and the other of a woman. But the most celebrated agate of this kind is that of Pyrrhus, wherein were represented the nine Muses, with their proper attributes, and Apollo in the middle playing on the harp †. In the emperor's cabinet is an oriental agate of a surprising bigness, being fashioned into a cup, whose diameter is an ell, abating two inches. In the cavity is found delineated in black specks, B. X R I S T O R. S. X X X. Other agates have also been found, representing the numbers 4191, 191; whence they were called *arithmetical* agates, as those representing men or women have obtained the name of *anthropomorphous*.

Great medicinal qualities were formerly attributed to the agate, such as resisting poisons, especially those of the viper, scorpion, and spider; but they are now very justly rejected from medicinal practice. The oriental ones are all said to be brought from the river Gambay. A mine of agates was some time ago discovered in Transylvania, of divers colours; and some of a large size, weighing several pounds.

Agates may be stained artificially with solution of silver in spirit of nitre, and afterwards exposing the part to the sun; and though these artificial colours disappear on laying the stone for a night in aquafortis, yet a knowledge of the practicability of thus staining agates, must render these curious figures above mentioned strongly suspected of being the work not of nature, but of art. Some account for these phenomena from natural causes. Thus Kircher, who had seen a stone of this kind in which were depicted the four letters usually inscribed on crucifixes, I. N. R. I. apprehends that some real crucifix had been buried under ground, among stones and other rubbish, where the inscription happening to be parted from the cross, and to be received among a soft mould or clay susceptible of the impression of the letters, came afterwards to be

petrified. In the same manner he supposes the agate of Pyrrhus to have been formed. Others resolve much of the wonder into fancy, and suppose those stones formed in the same manner with the *cameieux* * or Florentine stones. * See *Camaioux*.

The agate is used for making cups, rings, seals, handles for knives and forks, hilts for swords and hangers, beads to pray with, smelling boxes, patch-boxes, &c. being cut or sawed with no great difficulty. At Paris none have a right to deal in this commodity except the wholesale mercers and goldsmiths. The sword cutlers are allowed to sell it, but only when made into handles for *cousteaux de chasse*, and ready set in. The cutlers have the same privilege for their knives and forks.

Considerable quantities of these stones are still found near the river Achates in Sicily. There are found in some of these the surprising representations above mentioned, or others similar to them. By a dexterous management of these natural stains, medals have been produced, which seem masterpieces of nature: for this stone bears the graver well; and as pieces of all magnitudes are found, they make all sorts of work of it. The high altar of the cathedral of Messina is all over encrusted with it. The lapidaries pretend that the Indian agates are finer than the Sicilian; but Father Labat * informs us, that in the same quarries, and even in the same block, there are found pieces much finer than others, and these fine pieces are sold for Indian agates in order to enhance their prices. * *Voyage d'Ital.* tom. v. p. 156.

AGATE, among *Antiquaries*, denotes a stone of this kind engraven by art. In this sense, agates make a species of antique gems; in the workmanship whereof we find eminent proofs of the great skill and dexterity of the sculptors. Several agates of exquisite beauty are preserved in the cabinets of the curious; but the facts or histories represented on these antique agates, however well executed, are now become so obscure, and their explications so difficult, that several diverting mistakes and disputes have arisen among those who undertook to give their true meaning.

The great agate of the apotheosis of Augustus, in the treasury of the holy chapel, when sent from Constantinople to St Lewis, passed for a triumph of Joseph. An agate, which was in the French king's cabinet †, had been kept 700 years with great devotion, in the Benedictine abbey of St Evre at Toul, where it passed for St John the Evangelist carried away by an eagle, and crowned by an angel; but the Heathenism of it having been lately detected, the religious would no longer give it a place among their relicks, but presented it in 1684 to the king. The antiquaries found it to be the apotheosis of Germanicus. In like manner the triumph of Joseph was found to be a representation of Germanicus and Agrippina, under the figures of Ceres and Triptolemus. Another was preserved, from time immemorial, in one of the most ancient churches of France, where it had passed for a representation of paradise and the fall of man; there being found on it two figures representing Adam and Eve, with a tree, a serpent, and a Hebrew inscription round it, taken from the third chapter of Genesis, "The woman saw that the tree was good," &c. The French academists, instead of our first parents, found Jupiter and Minerva represented by the two figures: the inscription was of

† *Hist. Acad. R. Inscr.*
tom. i. p.
337—344.

Agathias
||
Agde.

a modern date, written in a Rabbinical character, very incorrect, and poorly engraven. The prevailing opinion was, that this agate represented simply the worship of Jupiter and Minerva at Athens.

AGATE is also the name of an instrument used by gold-wire drawers; so called from the agate in the middle of it, which forms its principal part.

AGATHIAS, or, as he calls himself in his epigrams, AGATHIUS, distinguished by the title of *Scholasticus*, a Greek historian in the 6th century under Justinian. He was born at Myrina, a colony of the ancient Æolians, in Asia the less, at the mouth of the river Phythicus. He was an advocate at Smyrna. Though he had a taste for poetry, he was yet more famous for his history, which begins with the 26th year of Justinian's reign, where Procopius ends. It was printed in Greek and Latin by Vulcanius, at Leyden, 1594, in 4to; and at Paris at the king's printing house, 1660, in folio.

AGATHO, the Athenian, a tragic and comic poet, was the disciple of Prodicus and Socrates, and applauded by Plato in his Dialogues for his virtue and beauty. His first tragedy obtained the prize; and he was crowned in the presence of upwards of 30,000 persons in the 4th year of the 90th Olympiad. There is nothing now extant of his works, excepting a few quotations, in Aristotle, Athenæus, and others.

AGATHOCLES, the famous tyrant of Sicily, was the son of a potter at Reggio. He was a thief, a common soldier, a centurion, a general, and a pirate, all in regular succession. He defeated the Carthaginians several times in Sicily, and was once defeated himself. He first made himself tyrant of Syracuse, and then of all Sicily; after which he vanquished the Carthaginians again both in Sicily and Africa. But at length having ill success, and being in arrears with his soldiers, they mutinied, forced him to fly his camp, and cut the throats of his children, whom he left behind. Recovering himself again, he relieved Corfu, besieged by Cassander; burnt the Macedonian fleet; returned to Sicily; murdered the wives and children of those who had murdered his: afterwards meeting with the soldiers themselves, he put them all to the sword; and, ravaging the sea-coast of Italy, took the city of Hipponium. He was at length poisoned by his grandson Archagathus, in the 72d year of his age, 290 years before Christ, having reigned 28 years.

AGATHYRNA, or AGATHYRNUM, AGATHYRSA, or AGATHYRNUM, in *Ancient Geography*, a town of Sicily; now *St Marco*; as old as the war of Troy, being built by Agathyrnus, son of Æolus, on an eminence. The gentilitious name is *Agathyrnaeus*; or, according to the Roman idiom, *Agathyrnensis*.

AGAVE, AMERICAN ALOE, in *Botany*. See *BOTANY Index*.

AGDE, a city of France, in the department of Herault, formerly the province of Languedoc, in the territory of Agadez, with a bishop's see. The diocese is small, but is one of the richest countries in the kingdom. It produces fine wool, wine, oil, corn, and silk. It is seated on the river Herault, a mile and a quarter from its mouth, where it falls into the gulf of Lyons, and where there is a fort built to guard its entrance. It is well peopled; the houses are built of black stone, and there is an entrance into the city by four gates.

The greatest part of the inhabitants are merchants or seamen. The public buildings are but mean: the cathedral is small, and not very handsome: the bishop's palace is an old building, but convenient. The city is extended along the river, where it forms a little port, wherein small craft may enter. There is a great concourse of pilgrims and other devout people to the chapel of Notre Dame de Grace. It is a little without the city, between which and the chapel there are about thirteen or fourteen oratories, which they visit with naked feet. The convent of the Capuchins is well built, and on the outside are lodgings and apartments for the pilgrims who come to perform their *neuvaine* or nine days devotion. The chapel, which contains the image of the Virgin Mary, is distinct from the convent. E. Long. 3. 28. N. Lat. 43. 19.

AGE, in the most general sense of the word, signifies the duration of any being, from its first coming into existence to the time of speaking of it, if it still continues; or to its destruction, if it has ceased to exist some time before we happen to mention it.

Among the ancient poets, this word was used for the space of 30 years; in which sense, *age* amounts to much the same with *generation*. Thus, Nestor is said to have lived *three ages* when he was 90 years old.—By ancient Greek historians, the time elapsed since the beginning of the world is divided into three periods, which they called *ages*. The first reaches from the creation to the deluge which happened in Greece during the reign of Ogyges; this they called the *obscure* or *uncertain* age, because the history of mankind is altogether uncertain during that period. The second they call the *fabulous* or *heroic* age, because it is the period in which the fabulous exploits of their gods and heroes are said to have been performed. It began with the Ogygian deluge, and continued to the first Olympiad; where the third or *historical* age commenced.—This division, however, it must be observed, holds good only with regard to the Greeks and Romans, who had no histories earlier than the first Olympiad; the Jews, Egyptians, Phœnicians, and Chaldees, not to mention the Indians and Chinese, who pretend to much higher antiquity, are not included in it.

The interval since the first formation of man has been divided by the poets into four *ages*, distinguished by the epithets of *golden*, *silver*, *brazen*, and *iron*. During the *golden* age, Saturn reigned in heaven, and justice and innocence in this lower world. The earth then yielded her productions without culture; men held all things in common, and lived in perfect friendship. This period is supposed to have lasted till the expulsion of Saturn from his kingdom. The *silver* age commenced when men began to deviate from the paths of virtue; and, in consequence of this deviation, their lives became less happy. The *brazen* age commenced on a farther deviation, and the *iron* age took place in consequence of one still greater. A late author, however, reflecting on the barbarism of the first ages, will have the order which the poets assign to the four ages inverted; the first being a time of rudeness and ignorance, more properly denominated an *iron* than a *golden* age. When cities and states were founded, the *silver* age commenced; and since arts and sciences, navigation and commerce, have been cultivated, the *golden* age has taken place.

Age.

In some ancient northern monuments, the *rocky* or *stony* age corresponds to the *brazen* age of the Greeks. It is called *rocky*, on account of Noah's ark, which rested on Mount Ararat; whence men were said to be descended and sprung from mountains: or from Deucalion and Pyrrha restoring the race of mankind, by throwing stones over their heads. The northern poets also style the fourth age of the world the *ashen* age, from a Gothic king Madenis, or Mannus, who on account of his great strength was said to be made of ash, or because in his time people began to make use of weapons made of that wood.

Among the Jews, the duration of the world is also divided into three ages. 1. The *seculum inane*, or *void age*, was the space of time from the creation to Moses. 2. The *present* age, denotes all the space of time from Moses to the coming of the Messiah; and, 3. The *age to come*, denotes the time from the coming of the Messiah to the end of the world.

Various other divisions of the duration of the world into *ages* have been made by historians.—The Sibylline oracles, wrote, according to some, by Jews acquainted with the prophecies of the Old Testament, divide the duration of the world into ten *ages*; and according to Josephus, each age contained six hundred years. It appears, by Virgil's fourth eclogue, and other testimonies, that the age of Augustus was reputed the end of those ten *ages*, consequently as the period of the world's duration.

By some, the space of time commencing from Constantine, and ending with the taking of Constantinople by the Turks in the 15th century, is called the *middle age*: but others choose rather to date the middle age from the division of the empire made by Theodosius at the close of the 4th century, and extend it to the time of the emperor Maximilian I. in the beginning of the 16th century, when the empire was first divided into circles.—The *middle* is by some denoted the *barbarous* age, and the latter part of it the *lowest* age. Some divide it into the *non-academical* and *academical* ages. The first includes the space of time from the 6th to the 9th century, during which schools or academies were lost in Europe. The second from the 9th century, when schools were restored, and universities established, chiefly by the care of Charlemagne.

The several *ages* of the world may be reduced to three grand epochs, viz. the *age* of the law of nature, called by the Jews the *void age*, from Adam to Moses; the *age* of the Jewish law, from Moses to Christ; and the *age* of grace, from Christ to the present year.

AGE is also frequently used in the same sense with *century*, to denominate a duration of 100 years.

AGE likewise signifies a certain period of the duration of human life; by some divided into four stages, namely, infancy, youth, manhood, and old age; the first extending to the 14th year, the second to the 25th, the third to the 50th, and the fourth to the end of life; by others divided into infancy, childhood, youth, manhood, and old age.

AGE, in *Law*, signifies a certain period of life, when persons of both sexes are enabled to do certain acts. Thus, one at twelve years of age ought to take the oath of allegiance to the king in a leet; at fourteen he may marry, choose his guardian, and claim his lands held in socage. Twenty-one is called *full age*, a man

or woman being then capable of acting for themselves, of managing their affairs, making contracts, disposing of their estates, and the like.

AGE of a Horse. See HORSE.

AGE of Trees. These after a certain age waste. An oak at an hundred years old ceases to grow. The usual rule for judging of the age of wood, is by the number of circles which appear in the substance of a trunk or stock cut perpendicularly, each circle being supposed the growth of a year; though some reject this method as precarious, alleging, that a simple circle is sometimes the produce of several years; besides that, after a certain age, no new circles are formed.

AGE-prior, in *Law*, is when an action being brought against a person under age, for lands descended to him, he, by motion or petition, shows the matter to the court, praying the action may be staid till his full age, which the court generally agrees to.

AGELNOTH, EGELNOTH, or ÆTHELNOTH, in Latin *Achelnodus*, archbishop of Canterbury, in the reign of Canute the Great, succeeded Livingus in that see in the year 1020. This prelate, furnished the *Good*, was son of Earl Agilmer, and at the time of his election, dean of Canterbury. After his promotion he went to Rome and received his pall from Pope Benedict VIII. In his way thither, as he passed through Pavia, he purchased, for an hundred talents of silver and one of gold, St Augustin's arm, which was kept there as a relic; and sent it over to England as a present to Leofric earl of Coventry. Upon his return, he is said to have raised the see of Canterbury to its former lustre. He was much in favour with King Canute, and employed his interest with that monarch to good purposes. It was by his advice the king sent over large sums of money for the support of the foreign churches; and Malmesbury observes, that this prince was prompted to acts of piety, and restrained from excesses, by the regard he had for the archbishop. Agelnoth, after he had sat 17 years in the see of Canterbury, departed this life on the 29th of October 1038, and was succeeded by Eadsius, King Harold's chaplain. This archbishop was an author, having written, 1. A Panegyric on the blessed Virgin Mary. 2. A Letter to Earl Leofric concerning St Augustin. 3. Letters to several persons.

AGEMA, in *Macedonian Antiquity*, was a body of soldiery, not unlike the Roman legion.

AGEMOGLANS, AGIAMOGLANS, or AZAMOGGLANDS, in the *Turkish Polity*, are children purchased from the Tartars, or raised every third year, by way of tribute, from the Christians tolerated in the Turkish empire. These, after being circumcised and instructed in the religion and language of their tyrannical masters, are taught the exercises of war, till they are of a proper age for carrying arms; and from this corps the janizaries are recruited. With regard to those who are thought unfit for the army, they are employed in the lowest offices of the seraglio. Their appointments also are very small, not exceeding seven aspers and a half *per day*, which amount to about threepence-halfpenny of our money.

AGEN, a city of France, on the river Garonne, the capital of Agenois, in the province of Guienne, now the department of the Garonne, and the see of a bishop. The gates and old walls, which are yet remaining, show that

Agelnoth
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Agen.

Agenda
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Agent.

that this city is very ancient, and that its former circuit was not so great as the present. The palace, wherein the presidial holds his sessions at this day, was heretofore called the castle of Montravel, and is seated without the walls of the old city, and on the side of the fossé. There are likewise the ruins of another castle called *La Sagne*, which was without the walls, close by a brook. Though the situation of Agen is convenient for trade and commerce, the inhabitants are so extremely indolent that there is very little; of which the neighbouring cities take the advantage. It is seated on the bank of the river Garonne, in a pleasant country; but is itself a very mean and disagreeable place, the houses being ill-built, and the streets narrow, crooked, and dirty. E. Long. o. 30. N. Lat. 44. 12.

AGENDA, among *Philosophers* and *Divines*, signifies the duties which a man lies under an obligation to perform: thus we meet with the *agenda* of a Christian, or the duties he ought to perform; in opposition to the *credenda*, or things he is to believe.

AGENDA, among *Merchants*, a term sometimes used for a memorandum-book, in which is set down all the business to be transacted during the day, either at home or abroad.

AGENDA, among *Ecclesiastical Writers*, denotes the service or office of the church. We meet with *agenda matutina et vespertina*, "the morning and evening prayers;" *agenda diei*, "the office of the day," whether feast or fast; *agenda mortuorum*, called also simply *agenda*, "the service of the dead."

AGENDA, is also applied to certain church-books, compiled by public authority, prescribing the order and manner to be observed by the ministers and people in the principal ceremonies and devotions of the church. In which sense *agenda* amounts to the same with what is otherwise called *ritual*, *liturgy*, *acalouthia*, *missal*, *formulary*, *directory*, &c.

AGENHINE, in our old writers, signifies a guest that has lodged at an inn for three nights, after which time he was accounted one of the family; and if he offended the king's peace, his host was answerable for him. It is also written HOGENHINE and HOGENHYNE.

AGENOIS, in *Geography*, a country of France, in the department of the Garonne, formerly the province of Guienne. It contains about one hundred and twenty square leagues; is fertile and healthy; and, according to Caesar, was inhabited by the Nitiobriges. It constituted part of the kingdom of Aquitania; was held by the counts of Toulouse, and successively by the English and French.

AGENORIA, in *Mythology*, the goddess of courage and industry, as *Vacuna* was of indolence.

AGENT, in a general sense, denotes any active power or cause. Agents are either natural or moral. Natural agents are such inanimate bodies as have a power to act upon other bodies in a certain and determinate manner; as, gravity, fire, &c. Moral agents, on the contrary, are rational creatures, capable of regulating their actions by a certain rule.

AGENT, is also used to denote a person intrusted with the management of an affair, whether belonging to a society, company, or private person.

AGENTES *in rebus*, one of the ranks of officers in the court of the Constantinopolitan emperors, whose busi-

ness was to collect and convey the corn both for the army and household; to carry letters and messages from court to all parts of the empire; to regulate couriers, and their vehicles; to make frequent journeys and expeditions through the provinces, in order to inspect any motions, disturbances, or machinations tending that way, and to give early notice thereof to the emperor.

The *agentes in rebus*, are by some made synonymous with our post-masters, but their functions were of great extent. They correspond to what the Greeks call *πυροφοροι*, and the Latins *veredarii*.

There were various orders or degrees of *agentes in rebus*; as *tribuni*, *primicerii*, *senatores*, *ducenarii*, *biarchi*, *circitores*, *equites*, *tyrones*, &c. through all which they rose *gradatim*. Their chief, who resided at Constantinople, was denominated *princeps*; which was a post of great dignity, being reckoned on a level with that of proconsul. They were settled in every part of the empire; and are also said to have served as interpreters.

AGER, in *Roman Antiquity*, a certain portion of land allowed to each citizen. See AGRARIAN LAW.

AGER PICENUS, or *Picenum*, in *Ancient Geography*, a territory of Italy to the south-east of Umbria, reaching from the Apennines to the Adriatic. The people are called *Picentes* (Cicero, Livy,) distinct from the Picentini on the Tuscan sea, though called by Greek writers *Πικεντιοι*. This name is said to be derived from the bird *picus*, under whose conduct they removed from the Sabines, of whom they were a colony.

AGERATUM, BASTARD HEMP-AGRIMONY, in *Botany*. See BOTANY Index.

AGESILAUS, king of the Lacedæmonians, the son of Archidamus, was raised to the throne in opposition to the superior claim of his nephew Leotychides. As soon as he came to the throne, he advised the Lacedæmonians to anticipate the king of Persia, who was making great preparations for war, and to attack him in his own dominions. He was himself chosen for this expedition; and gained so many advantages over the enemy, that if the league which the Athenians and the Thebans formed against the Lacedæmonians had not obliged him to return home, he would have carried his victorious arms into the very heart of the Persian empire. He gave up, however, all these triumphs readily, to come to the succour of his country, which he happily relieved by his victory over the allies in Bœotia. He obtained another near Corinth; but to his great mortification, the Thebans afterward gained several over the Lacedæmonians. These misfortunes at first raised a clamour against him. He had been sick during the first advantages which the enemy gained; but as soon as he was able to act in person, his valour and prudence prevented the Thebans from reaping the advantages of their victories; so that it was generally believed, had he been in health at the beginning, the Lacedæmonians would have sustained no losses, and that all would have been lost had it not been for his assistance. It cannot be denied but he loved war more than the interest of his country required; for if he could have lived in peace, he had saved the Lacedæmonians several losses, and they would not have been engaged in many enterprises which in the end contributed much to weaken their power. He died in the

Ager
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Agelauts.

Agefilaus
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Agger.

third year of the 104th Olympiad, being the 84th year of his age and 41st of his reign, and was succeeded by his son Archidamus. Agefilaus would never suffer any picture or sculpture to be made of him, and prohibited it also by his will: this he is supposed to have done from a consciousness of his own deformity; for he was of a short stature, and lame of one foot, so that strangers used to despise him at the first sight. His fame went before him into Egypt, and there they had formed the highest idea of Agefilaus. When he landed in that country, the people ran in crowds to see him: but great was their surprise when they saw an ill dressed, slovenly, mean-looking little fellow, lying upon the grass: they could not forbear laughing, and applied to him the fable of the mountain in labour. He was, however, the first to jest upon his own person; and such was the gaiety of his temper, and the strength with which he bore the roughest exercises, that these qualities made amends for his corporeal defects. He was remarkable for plainness and frugality in his dress and mode of life. "This (says Cornelius Nepos) is especially to be admired in Agefilaus: when very great presents were sent him by kings, governors, and states, he never brought any of them to his own house; he changed nothing of the diet, nothing of the apparel of the Lacedæmonians. He was contented with the same house in which Euristhenes, the founder of his family, had lived: and whoever entered there, could see no sign of debauchery, none of luxury; but on the contrary, many of moderation and abstinence; for it was furnished in such a manner, that it differed in nothing from that of any poor or private person." Upon his arrival in Egypt, all kinds of provisions were sent to him; but he chose only the most common, leaving the perfumes, the confections, and all that was esteemed most delicious, to his servants. Agefilaus was extremely fond of his children, and would often amuse himself by joining in their diversions: one day when he was surprised riding upon a stick with them, he said to the person who had seen him in this posture, "Forbear talking of it till you are a father."

AGGA, or AGGONNA, a British settlement on the Gold coast of Guinea. It is situated under the meridian of London, in 6 degrees of N. Lat.

AGGER, in the *Ancient Military Art*, a work of fortification, used both for the defence and the attack of towns, camps, &c. In which sense it is the same with what was otherwise called *vallum*, and in later times *aggerstum*; and among the moderns *lines*, sometimes *cavaliers*, *terrasses*, &c. The agger was usually a bank, or elevation of earth or other matter, bound and supported with timber; having sometimes turrets on the top, wherein the workmen, engineers, and soldiery, were placed. It was also accompanied with a ditch, which served as its chief defence. The usual materials of which it was made were earth, boughs, fascines, stakes, and even trunks of trees, ropes, &c. variously crossed, and interwoven somewhat in the figure of stars; whence they were called *stellati axes*. When these were wanting, stones, bricks, tiles, supplied the office: on some occasions, arms, utensils, pack-saddles, were thrown in to fill it up. We even read of aggers formed of the carcasses of the slain; sometimes of dead bones mixed with lime; and even with the heads of slaughtered citizens. For want of due binding, or solid materials,

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aggers have sometimes tumbled down, with infinite mischief to the men. The besiegers used to carry on a work of this kind nearer and nearer towards the place, till at length they reached the very wall. The methods taken on the other side to defeat them were, by fire, especially if the agger were of wood; by sapping and undermining, if of earth; and in some cases, by erecting a counter agger,

The height of the agger was frequently equal to that of the wall of the place. Cæsar tells us of one he made, which was 30 feet high and 330 feet broad. Besides the use of aggers before towns, the generals used to fortify their camps with such works; for want of this precaution, armies have often been surprised and ruined.

There were vast aggers made in towns and places on the sea-side, fortified with towers, castles, &c. Those made by Cæsar and Pompey at Brundisium, are famous. Sometimes aggers were even built across arms of the sea, lakes, and morasses; as was done by Alexander before Tyre, and by M. Antony and Cassius.—The wall of Severus, in the north of England, may be considered as a grand agger, to which belong several lesser ones.

AGGER, in ancient writers, likewise denotes the middle part of a military road, raised into a ridge, with a gentle slope on either side, to make a drain for the water, and keep the way dry.

The term is also used for the whole road, or military way. Where highways were to be made in low grounds, as between two hills, the Romans used to raise them above the adjacent land, so as to make them of a level with the hills. These banks they called *aggeres*. Bergier mentions several in Gallia Belgica, which were thus raised, ten, fifteen, or twenty feet above ground.—They are sometimes also called *aggeres calceati*; and now generally known by the name *chauffees* or *causeways*.

AGGERHUYS, a city of Norway, capital of the province of the same name, subject to Denmark, and situated in E. Long. 28. 35. and N. Lat. 59. 30.

AGGERS-HERRED, a district of Christianland, and a diocese of Norway. It consists of three juridical places: namely, Afcher, West Barm, and Agger.

AGGLUTINANTS, in *Pharmacy*, a general name for all medicines of a glutinous or viscid nature; which, by adhering to the solids, were supposed to contribute to repair their loss.

AGGLUTINATION, in a general sense, denotes the joining two or more things together, by means of proper glue or cement.

AGGLUTINATION, among *Physicians*, implies the action of reuniting the parts of a body, separated by a wound, cut, &c. It is also applied to the action of such internal medicines as are supposed to be of an agglutinating quality.

AGGREGATE, in a general sense, denotes the sum of several things added together, or the collection of them into one whole. Thus, a house is an aggregate of stones, wood, mortar, &c. It differs from a mixed or compound; for, in the latter, the union is more intimate than between the parts of an aggregate.

AGGREGATE, in *Botany*, is a term used to express those flowers which are composed of parts or florets, so united, by means either of the receptacle or calyx,

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that

Aggerhuys
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Aggregate.

Aggregation
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Agincourt.

that no one of them can be taken away without destroying the form of the whole. They are opposed to simple flowers, which have no such common part. See *BOTANY Index*.

AGGREGATION, in *Physics*, a species of union, whereby several things which have no natural dependence or connexion with one another are collected together, so as in some sense to constitute one. Thus, a heap of sand, or a mass of ruins, are bodies by aggregation.

AGHER, a town of Ireland, situated in the southern part of Ulster, not far from Clogher.

AGHRIM, a town of Ireland, in the county of Wicklow, and province of Leinster, situated about 31 miles south-west of Wicklow.

AGHRIM, in Galway; a small village, distant about 32 miles from Dublin, and rendered memorable by a decisive battle fought there, and at Kilcommodon-hill, the 12th of July 1691, between General Ginkle and Monsieur St Ruth, the commanders under King William III. and James II. when St Ruth, the general of the Irish army, with 7000 of his men, was slain; but of the English only 600. The victory was more considerable, as the English army consisted of no more than 18,000 men; whereas the Irish were computed at 20,000 foot and 5000 horse and dragoons. They lost likewise nine pieces of brass cannon; all their ammunition, tents, and baggage; most of their small arms, which they threw away to expedite their flight; with 11 standards, and 32 pair of colours.

AGIADES, in the Turkish armies, a kind of pioneers employed in fortifying camps, smoothing of roads, and the like offices.

AGILITY, an aptitude of the several parts of the body to motion. The improving of agility was one of the chief objects of the institution of games and exercises. The athletes made particular profession of the science of cultivating and improving agility. Agility of body is often supposed peculiar to some people; yet it seems less owing to any thing peculiar in their frame and structure than to practice.

AGINCOURT, a village of the French Netherlands, situated in E. Long. 2. 10. N. Lat. 50. 35.; famous on account of the victory obtained by Henry V. of England over the French, in 1415.

The army of Henry, after landing in France, was by various accidents reduced to 10,000 men, of whom not a few were sick, or slowly recovering from sickness;—they had to traverse a long tract of country, inhabited by exasperated enemies, from whom they were to procure provisions, lodging, guides, intelligence, and every thing they wanted;—that country was defended by many strong towns, intersected by deep rivers, and guarded by an army of 100,000 or (according to some contemporary writers) 140,000 men.

Henry, undaunted by all these dangers and difficulties, departed from Harfleur, marching his army in three lines, with bodies of cavalry on the wings. He proceeded by very easy journeys, that he might not fatigue his troops, or discourage them by the appearance of a flight; observing the strictest discipline, and paying generously for every thing he received; which induced the country people to bring provisions to his camp, in spite of all the commands they had received to the contrary. To keep his men in spirits, and from

repining, the king fared as ill as the meanest soldier, Agincourt, always appearing with a cheerful countenance, and addressing them in the most friendly and encouraging language. They arrived at the village of Agincourt in the county of St Pol, on the evening of October 24th; and there beheld the whole French army, at a small distance, directly in their route. The king took an attentive view of it from an eminence; and being fully convinced that it was impossible to proceed any further on his way to Calais without a battle, and equally impossible to return to Harfleur with so great an army in his rear, resolved to hazard an action next morning, as the only means of preserving himself and his little army from destruction.

The English army lodged that night in the villages of Agincourt, Maifoncelle, and some others; where they met with better accommodation than they had been accustomed to for some time past, and spent part of their time in mutual exhortations to fight bravely in the approaching battle. The king, overhearing some of his nobles expressing a wish, that the many brave men who were idle in England were present to assist them, is said to have cried out—“No! I would not have one man more:—if we are defeated, we are too many—if it shall please God to give us the victory, as I trust he will, the smaller our number the greater our glory.” The moon happening to shine very bright, Henry, with some of his best officers, carefully examined the ground, and pitched upon a field of battle, admirably calculated to preserve a small army from being surrounded by a great one. It was a gentle declivity from the village of Agincourt, of sufficient extent for his small army, defended on either side by hedges, trees, and brush-wood. Having placed guards and kindled fires on all sides, the king and his army betook themselves to rest; except such as were of a more serious turn of mind, who, considering that as the last night of their lives, spent it in devotion.

The French, exulting in their numbers, confident of victory, and abounding in provisions, spent the night in noisy festivity, and in forming fanciful schemes about the disposal of their prisoners and their booty. It was in general resolved to put all the English to the sword, except the king and the chief nobility, who were to be taken prisoners for the sake of their ransoms.

On the morning of Friday the memorable 25th of October, A. D. 1415, the day of Crispin and Crispianus, the English and French armies were ranged in order of battle, each in three lines, with bodies of cavalry on each wing. The constable d'Albert, who commanded the French army, fell into the snare that was laid for him, by drawing up his army in the narrow plain between the two woods. This deprived him, in a great measure, of the advantage he should have derived from the prodigious superiority of his numbers; obliged him to make his lines unnecessarily deep, about 30 men in file; to crowd his troops, particularly his cavalry, so close together, that they could hardly move or use their arms; and, in a word, was the chief cause of all the disasters that followed. The French, it is said, had a considerable number of cannon of different sizes in the field; but we do not hear that they did any execution, probably for want of room. The first line of the French army, which consisted of 8000 men—
at arms

Agincourt. at-arms on foot mixed with 4000 archers, with 500 men-at-arms mounted on each wing, was commanded by the constable d'Albert, the dukes of Orleans and Bourbon, and many other nobles; the dukes of Alençon, Brabant, and Bar, &c. conducted the second line; and the earls of Marle, Damartine, Fauconberg, &c. were at the head of the third line. The king of England employed various arts to supply his defect of numbers. He placed 200 of his best archers in ambush, in a low meadow, on the flank of the first line of the French. His own first line consisted wholly of archers, four in file; each of whom, besides his bow and arrows, had a battle-axe, a sword, and a stake pointed with iron at both ends, which he fixed before him in the ground, the point inclining outwards, to protect him from cavalry. This was a new invention, and had a happy effect. That he might not be encumbered, he dismissed all his prisoners, on their word of honour to surrender themselves at Calais, if he obtained the victory; and lodged all his baggage in the village of Agincourt, in his rear, under a slender guard. The command of the first line was, at his earnest request, committed to Edward duke of York, assisted by the Lords Beaumont, Willoughby, and Fanhope; the second was conducted by the king, with his youngest brother Humphry duke of Gloucester, the earls of Oxford, Marshal, and Suffolk; and the third was led by the duke of Exeter, the king's uncle. The lines being formed, the king, in shining armour, with a crown of gold adorned with precious stones on his helmet, mounted on a fine white horse, rode along them, and addressed each corps with a cheerful countenance and animating speeches. To inflame their resentment against their enemies, he told them, that the French had determined to cut off three fingers of the right hand of every prisoner: and to rouse their love of honour, he declared, that every soldier in that army who behaved well, should from henceforth be deemed a gentleman, and entitled to bear coat armour.

When the two armies were drawn up in this manner, they stood a considerable time gazing at one another in solemn silence. But the king, dreading that the French would discover the danger of their situation and decline a battle, commanded the charge to be sounded, about ten o'clock in the forenoon. At that instant, the first line of the English kneeled down, and kissed the ground; and then starting up, discharged a flight of arrows, which did great execution among the crowded ranks of the French. Immediately after, upon a signal being given, the archers in ambush arose, and discharged their arrows on the flank of the French line, and threw it into some disorder. The battle now became general, and raged with uncommon fury. The English archers, having expended all their arrows, threw away their bows, and, rushing forward, made dreadful havoc with their swords and battle-axes. The first line of the enemy was, by these means, defeated; its leaders being either killed or taken prisoners. The second line, commanded by the duke d'Alençon, (who had made a vow either to kill or take the king of England, or to perish in the attempt), now advanced to the charge, and was encountered by the second line of the English, conducted by the king. This conflict was more close and furious than the former. The duke of Gloucester, wounded and unhorsed,

was protected by his royal brother till he was carried off the field. The duke d'Alençon forced his way to the king, and assaulted him with great fury; but that prince brought him to the ground, where he was instantly dispatched. Discouraged by this disaster, the second line made no more resistance; and the third fled without striking a blow; yielding a complete and glorious victory to the English, after a violent struggle of three hours duration.

The king did not permit his men to pursue the fugitives to a great distance, but encouraged them to take as many prisoners as they could on or near the field; in which they were so successful, that, in a little time, his captives were more numerous than his soldiers. A great proportion of these prisoners were men of rank and fortune; for many of the French noblesse being on foot, and loaded with their heavy armour, could not make their escape. Among these were the dukes of Orleans and Bourbon, the marshal Boucicaut, the counts d'Eu, Vendome, Richemont, and Harcourt; and 7000 barons, knights, and gentlemen. The French left dead on the field of battle, the constable d'Albert, the three dukes of Alençon, Brabant, and Bar, the archbishop of Sens, one marshal, 13 earls, 92 barons, 1500 knights, and a far greater number of gentlemen, besides several thousands of common soldiers. Even the French historians acknowledge, that the loss of the English was inconsiderable: those of our own cotemporary writers who make it the greatest, affirm, that it did not exceed 100, and that the duke of York and the earl of Suffolk were the only great men who fell on that side in this memorable action.

AGIO, in *Commerce*, is a term chiefly used in Holland, and at Venice, to signify the difference between the value of bank stock and the current coin. The agio in Holland is generally three or four *per cent.* and at Rome it is from 15 to 25 *per cent.* but at Venice the agio is fixed at 20 *per cent.*

AGIOSYMANDRUM, a wooden instrument used by the Greek and other churches under the dominion of the Turks, to call together assemblies of the people. The *agiosymandrum* was introduced in the place of bells, which the Turks prohibited their Christian subjects the use of, lest they should make them subservient to sedition.

AGIS, king of Lacedæmon, was descended from Agefilaus II. in a right line. He projected the reformation of his kingdom, by the restoring of the laws of Lycurgus; but he fell under the weight of an enterprise that could not but be disagreeable to all those who had great possessions, and had been long accustomed to the sweets of a voluptuous life. Agis being in the flower of his age, and having a very refined desire of glory, practised the ancient discipline first in his own person: his clothes and his table were according to the manners of former times; which is so much the more to be admired, because Agefistrata his mother and Archidamia his grandmother had brought him up voluptuously. When he founded his project less than those who had enjoyed a relaxation of discipline several years. The greatest difficulty was expected to arise from the women. They had at that time more credit than ever; for their power is never greater than when luxury is in fashion. Agefilaus's mother did not at all

Agio
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Agis.

Agis.

relish the proposed reformation. She must have lost her riches, which gave her a share in a thousand sorts of intrigues; so she opposed the design at once, and treated it as a chimera. But her brother Agefilaus, whom Agis had engaged in his interests, knew how to manage her in such a manner, that she promised to second the enterprise. She endeavoured to gain the women: but instead of suffering themselves to be persuaded, they applied to Leonidas the other king of Lacedæmon, and humbly besought him to frustrate the designs of his colleague. Leonidas durst not oppose it openly, for fear of irritating the people; to whom the reformation was agreeable, because they found their account in it. He contented himself with countermining it by intrigues, and sowing suspicions as if Agis had aspired to tyranny, by pulling down the rich and raising the poor. Agis did not fail to propose his new laws to the senate, relating to the discharge of debts, and a new division of the lands. Leonidas, being supported by the rich, opposed this project so strongly, that there was one voice more against it than for it. He paid dear for his success in this affair. Lyfander, one of the Ephori, who had been the grand promoter of the reformation, called him to account; alleged the celestial signs; and put to death Cleombrotus, a prince of the royal blood and son-in-law to Leonidas, to make sure of the kingdom. Leonidas being frightened at this, took refuge in a temple; whither his daughter, the wife of Cleombrotus, followed him. He was summoned; and because he did not appear, he was degraded of his dignity, which was conferred on Cleombrotus. He obtained leave to retire to Tegæa. The new Ephori had Lyfander and Mandroclidas tried for innovation: these persuaded the two kings to unite and turn out these Ephori. The thing was brought about; but not without a great uproar in the city. Agefilaus, one of the Ephori that succeeded those who were just turned out, would have caused Leonidas to be killed on the way to Tegæa, if Agis had not sent him a strong guard. The reformation might then have been established, if Agefilaus had not found means to elude the good intentions of the two kings. Whilst this was transacting, the Achæians asked assistance; which was given them, and Agis had the command of the troops. He acquired a good deal of reputation in this campaign. At his return, he found his affairs so embroiled by the ill conduct of Agefilaus, that it was impossible for him to maintain himself. Leonidas was recalled to Lacedæmon: Agis retired into one temple and Cleomenes into another. The wife of the latter behaved herself in such a manner that she became the admiration of every body. Leonidas was contented with banishing his son-in-law; after which he applied himself entirely to the ruin of Agis. One of the Ephori, who had no mind to return what Agefistrata had lent him, was the principal instrument of the misfortune of this family. Agis never went out of his sanctuary but to bathe. One day, as he was returning from thence to the temple, he was seized by that Ephorus and carried to prison. Then he was brought to his trial and condemned to death, and delivered to the executioner. His mother and grandmother used all the intreaty and importunity imaginable, that, as he was king of Lacedæmon, he might at least be permit-

ted to plead his cause before the people. But they were apprehensive lest his words would make too great an impression, and therefore they ordered him to be strangled that very hour. The Ephorus who was in debt to Agefistrata permitted that princess to go into the prison; which he granted likewise to Agis's grandmother: but he gave orders to strangle them one after another. Agefistrata died in a manner that was extremely to her honour. The wife of Agis, who was a princess of great fortune and prudence, and one of the finest ladies in Greece, was forced away from her apartment by King Leonidas, and obliged to marry his son, who was then very young, and hardly fit for marriage.

AGISTMENT, AGISTAGE, or AGISTATION, in *Law*, the taking in other people's cattle to graze at so much per week. The term is peculiarly used for the taking cattle to feed in the king's forests, as well as for the profits arising from that practice.—It is also used, in a metaphorical sense, for any tax, burden, or charge; thus, the tax levied for repairing the banks of Romney-marsh was called *agistamentum*.

AGISTOR, or AGISTATOR, an officer belonging to forests, who has the care of cattle taken in to be grazed, and levies the monies due on that account. They are generally called *quest-takers* or *gift-takers*, and are created by letters-patent. Each royal forest has four agistors.

AGISYMBOLA, in *Ancient Geography*, a district of Libya Interior, according to Agathemerus, situated to the south-east of the Æthiopes Anthropophagi; the parallel passing through which, at 16° to the south of the equator, was the utmost extent of the knowledge of the ancients to the south (Ptolemy).

AGITATION, the act of shaking a body, or tossing it backwards and forwards.

AGITATION, in *Physics*, is often used for an intestine commotion of the parts of a natural body. Fermentation and effervescence are attended with a brisk agitation of the particles.

AGITATION is one of the chief causes or instruments of mixture: by the agitation of the parts of the blood and chyle, in their continual circulation, sanguification is in a good measure effected. Butter is made out of milk by the same means: in which operation, a separation is made of the oleous parts from the serous, and a conjunction of the oleous together. Digestion itself is only supposed to be an insensible kind of agitation.

AGITATION is reputed one of the symptoms of inspiration. Petit informs us*, that in the last century, there arose in a church of Italy, for the space of a year, a vapour of an extraordinary kind, which put all the people into trembling and agitations, and unless they got away betimes, set them a dancing, with strange contortions and gesticulations. This seems to verify what has been related of the temple of Delphi.

AGITATION is also used in *Medicine* for a species of exercise popularly called *swinging*. Maurice prince of Orange found this method a relief against the severe pains of the gout and stone. Bartholine mentions fits of the toothach, deafness, &c. removed by vehement agitations of the body.

AGITATOR, in *Antiquity*, a term sometimes used for a charioteer, especially those who drove in the circus at the curule games.

AGITATORS,

Agistment
||
Agitator.

* *Petit de Sibylla*, l. 1.
Nouv. Rep. Litt. tom. viii. p. 1113.

Agitators
||
Agnoetæ.

AGITATORS, in the *English History*, certain officers set up by the army in 1647, to take care of its interests.—Cromwell joined the agitators, only with a view to serve his own ends; which being once accomplished, he found means to get them abolished.

AGLAIA, the name of the youngest of the three Graces, espoused to Vulcan.

AGLIONBY, JOHN, an English divine, chaplain in ordinary to King James I. was born in Cumberland, and admitted a student at Oxford in 1583. He was a man of universal learning, and had a very considerable hand in the translation of the New Testament appointed by King James I. in 1604. He died in 1609.

AGMEN, in *Antiquity*, properly denotes a Roman army in march: in which sense, it stands contradistinguished from *acies*, which denoted the army in battle array; though, on some occasions, we find the two words used indifferently for each other. The Roman armies, in their marches, were divided into *primum agmen*, answering to our van-guard; *medium agmen*, our main-guard; and *postremum agmen*, the rear-guard. The order of their march was thus: After the first signal with the trumpets, &c. the tents were taken down, and the baggage packed up; at the second signal the baggage was to be loaded on the horses and carriages; and, at the third signal, they were to begin their march. First came the *extraordinarii*; then the auxiliaries of the first wing, with their baggage; these were followed by the legions. The cavalry marched either on each side or behind.

AGNATE, in *Law*, any male relation by the father's side.

AGNEL, an ancient French gold coin, first struck under the reign of St Louis, worth about twelve sols six deniers. The agnel is also called sometimes *mouton d'or*, and *agnel d'or*. The denomination is supposed to have arisen from the figure of a lamb (*agnus*), or sheep, struck on one side.

AGNES, SAINT, in *Geography*, one of the Scilly isles, on the west of England, which is of small extent, but well cultivated, and fertile in corn and grass. On the most elevated part of the island stands the lighthouse, built of stone, which is 51 feet high. The whole inhabitants consist of about 50 families. It is situated in N. Lat. 49. 56. W. Long. 6. 46.

AGNO, a river of Naples, which, taking its rise in the mountainous parts of Terra di Lavoro, washes the town of Acerra; and, passing between Capua and Aversa, falls into the Mediterranean, about seven miles north of Puzzuoli.

AGNOETÆ (from *αγνοεω*, to be ignorant of), in *Church History*, a sect of ancient heretics, who maintained that Christ, considered as to his human nature, was ignorant of certain things, and particularly of the time of the day of judgment. Eulogius, patriarch of Alexandria, ascribes this heresy to certain solitaries in the neighbourhood of Jerusalem, who built their opinion upon the text Mark xiii. 32. "Of that day and hour knoweth no man, no not the angels who are in heaven, neither the Son, but the Father only."—The same passage was made use of by the Arians; and hence the orthodox divines of those days were induced to give various explications thereof. Some allege, that our Saviour here had no regard to his divine nature, but only spoke of his human. Others understand it

thus, That the knowledge of the day of judgment does not concern our Saviour considered in his quality of Messiah, but God only: which is the most natural solution.

AGNOMEN, in *Roman Antiquity*, a kind of fourth or honorary name, given to a person on account of some extraordinary action, virtue, or other accomplishment. Thus the agnomen *Africanus* was bestowed upon Publius Cornelius Scipio, on account of his great achievements in Africa.—The agnomen in order of the three Roman names: thus, in Marcus Tullius Cicero, Marcus is the prænomen, Tullius the nomen, and Cicero the *agnomen*.

AGNUS, or **LAMB**, in *Zoology*, the young of the oviv or sheep. See **OVIS**.

AGNUS CASTUS, in *Botany*, the trivial name of a species of the vitex. See **VITEX**, **BOTANY Index**. The Greeks call it *αγνος*, *chaste*; to which has since been added the reduplicative *castus*, *q. d.* chaste, chaste. It was famous among the ancients as a specific for the preservation of chastity. The Athenian ladies, who made profession of chastity, lay upon leaves of *agnus castus* during the feasts of Ceres.—From the time of Dioscorides the seeds of *agnus castus* have been much celebrated for their antiaphrodisiac virtue. Modern writers ascribe to them an opposite effect; but they are seldom used in practice.

AGNUS DEI, in the church of Rome, a cake of wax stamped with the figure of a lamb supporting the banner of the cross. These being consecrated by the pope with great solemnity, and distributed among the people, are supposed to have great virtues; as, to preserve those who carry them worthily, and with faith, from all manner of accidents; to expel evil spirits, &c. The name literally signifies *Lamb of God*; this being supposed an image or representation of the Lamb of God who took away the sins of the world. They cover it up with a piece of stuff cut in form of a heart, and carry it very devoutly in their processions.—The Romish priests and religious derive considerable pecuniary advantage from selling these *Agnus Dei's* to some, and presenting them to others. The pope provides a regular supply, by consecrating once in seven years: they are distributed by the master of the wardrobe, and received by the cardinals and other prelates, with great reverence, in their caps and mitres.—This ceremony they pretend to derive from an ancient custom of the church, wherein part of the paschal taper consecrated on Holy Thursday was distributed among the people; to perfume their houses, fields, &c. in order to drive away devils, and to preserve them from storms and tempests. The *Agnus Dei* is forbidden to be brought into England under pain of incurring a *premunire*; 13 Eliz. cap. 2.

AGNUS DEI is also a popular name for that part of the mass wherein the priest, striking his breast three times, rehearses, with a loud voice, a prayer beginning with the words *Agnus Dei*.—It is said to have been first brought into the missal by Pope Sergius I.

AGOGÉ, among ancient musicians, a species of modulation, wherein the notes proceed by continuous degrees.

AGON, among the *Ancients*, implied any dispute or contest, whether it had regard to bodily exercises or the accomplishments of the mind; and therefore poets, musicians,

Agnomen
||
Agon.

Agon
||
Agonotheta.

musicians, painters, &c. had their agones, as well as the *athletæ*. Games of this kind were celebrated at most of the heathen festivals with great solemnity, either annually, or at certain periods of years. Among the latter were celebrated at Athens, the *agon gymnicus*, the *agon Nemeus* instituted by the Argives in the 53d Olympiad, and the *agon Olympius* instituted by Hercules 430 years before the first Olympiad.—The Romans also, in imitation of the Greeks, instituted contests of this kind. The emperor Aurelian established one under the name of *agon solis*, the contest of the sun; Dioclesian another, which he called *agon capitolinus*, which was celebrated every fourth year, after the manner of the Olympic games. Hence the years, instead of *lustra*, are sometimes numbered by *agones*.

AGON also signified one of the ministers employed in the heathen sacrifices, and whose business it was to strike the victim. The name is supposed to have been derived from hence, that standing ready to give the stroke, he asked, *Agon?* or *Agone?* Shall I strike.

AGONALES, an epithet given to the SALII.

AGONALIA, in *Roman Antiquity*, festivals celebrated in honour of Janus, or the god Agonius, whom the Romans invoked before undertaking any affair of importance.

AGONALIS circus, now *La Piazza Navona*, a long, large, beautiful street in the heart of Rome, adorned with fountains, and the obelisk of Caracalla, still retaining the form of that circus. The reason of the name *Agonalis* is either unknown or doubtful. Ovid seems to derive it from the *agones*, or solemn games, there celebrated; supposed to have been the *Ludi Apollinares*, or *Athiaci*, instituted by Augustus; whence the circus was called *Apollinaris*; also *Alexandrinus*, from the emperor Alexander Severus, who either enclosed or repaired it.

AGONISMA, in *Antiquity*, denotes the prize given to the victor in any combat or dispute.

AGONISTARCHA, from *αγων* "combat," and *αρχος* "chief," in *Antiquity*, seems to have been much the same with *agonotheta*; though some suggest a difference, making it the office of the former to preside at and direct the private exercises of the *athletæ*, which they went through by way of practice, before they made their appearance on the public theatres or amphitheatres.

AGONISTICI, in *Church History*, a name given by Donatus to such of his disciples as he sent to fairs, markets, and other public places, to propagate his doctrine; for which reason they were also called *Circuiores*, *Circelliones*, *Catropitæ*, *Coropitæ*, and at Rome *Montenses*. They were called *Agonistici*, from the Greek *αγων*, "combat," in regard they were sent as it were to fight and subdue the people to their opinions.

AGONIUM, in *Roman Antiquity*, was used for the day on which the *rex sacrorum* sacrificed a victim, as well as for the place where the games were celebrated, otherwise called *agon*.

AGONOTHETA, or AGONOTHETES, in *Grecian Antiquity*, was the president or superintendant of the sacred games; who not only defrayed the expences attending them, but inspected the manners and discipline of the *athletæ*, and adjudged the prizes to the victors.

AGONY, any extreme pain. It is also used for

the pangs of death. Much of the terror of death consists in the pangs and convulsions wherewith the agony seems attended; though we have reason to believe that the pain in such cases is ordinarily not extremely acute; a course of pain and sickness having usually stupified and indisposed the nerves for any quick sensations. However, various means have been thought of for mitigating the agony of death. Lord Bacon considers this as part of the province of a physician; and that not only when such a mitigation may tend to a recovery, but also when, there being no further hopes of a recovery, it can only tend to make the passage out of life more calm and easy. Complacency in death, which Augustus so much desired, is certainly no small part of happiness. Accordingly the author last cited ranks *euthanasia*, or the art of dying easily, among the desiderata of science; and does not even seem to disapprove of the course Epicurus took for that end,

—*Hinc stygias ebrius hausit aquas.*

Opium has been applied for this purpose, with the applause of some, but the condemnation of more.

AGONYCLITÆ, or AGONYCLITES, in *Church History*, a sect of Christians, in the 7th century, who prayed always standing, as thinking it unlawful to kneel.

AGORÆUS, in *Heathen Antiquity*, an appellation given to such deities as had statues in the market-places; particularly Mercury, whose statue was to be seen in almost every public place.

AGORANOMUS, in *Grecian Antiquity*, a magistrate of Athens, who had the regulation of weights and measures, the prices of provisions, &c.—The *agoranomi*, at Athens, were ten in number, five belonging to the city, and as many to the Piræus; though others make them 15 in all, of whom they assign 10 to the city. To these a certain toll or tribute was paid by all who brought any thing to sell in the market.

AGOUTI, or AGUTI. See MUS.

AGRA, the capital town of a province of the same name, in Hindostan, and in the dominions of the Great Mogul. It is looked upon as the largest city in these parts, and is in the form of a half moon. A man on horseback can hardly ride round it in a day. It is surrounded with a wall of red stone, and with a ditch 100 feet wide. The palace is prodigiously large, and the seraglio commonly contains above 1000 women. There are upwards of 800 baths in this town; but that which travellers most admire, is the mausoleum of one of the Mogul's wives, which was 20 years in building. The indigo of Agra is the most valuable of all that comes from the East Indies. This town is seated on the river Jemma, about 50 miles above its confluence with the Tehemel, and is 300 miles N. E. of Surat. E. Long. 76. 44. N. Lat. 26. 43.

AGRARIAN LAWS, among the Romans, those relating to the division and distribution of lands; of which there were a great number; but that called the *Agrarian Law*, by way of eminence, was published by Spurius Cassius, about the year of Rome 268, for dividing the conquered lands equally among all the citizens, and limiting the number of acres which each citizen might enjoy.—The Roman lands were of several kinds; some conquered from the enemies, and not yet brought to the public account; others brought in-

Agonyclitæ
||
Agrarian.

deed

Agricola
Agricola

deed to the public, but clandestinely usurped by private great men; lastly, others purchased with the public money, in order to be divided. Agrarian laws, either for dividing lands taken from the enemy, or the public lands, or those purchased with the public money, were easily passed without disturbance; but those whereby private rich men were to be deprived of their lands, and the common people put in possession of what had been held by the nobility, were never attempted without great disturbances.

Several have pleaded for the necessity of agrarian laws among us: but no author has entered so deeply into the subject as Mr Harrington in his *Oceana*; which the reader may consult.

AGREDA, a town of Spain, in Old Castile, near the frontiers of Arragon, and about three leagues south-west of Taracon.

AGRIA, called by the Germans *Eger*, is a small but strong town in Upper Hungary, and is a bishop's see. It is situated on a river of the same name, and has a citadel called *Eriaw*. It was besieged by the Turks in 1552, with 70,000 men: but they lost 8000 in one day; and were obliged to raise the siege, though the garrison consisted only of 2000 Hungarians, assisted by the women, who performed wonders on this occasion. However, it was afterwards taken by Mahomet III. in 1596; but was retaken by the emperor in 1687: since which time it has continued under the dominion of the house of Austria. It is 47 miles north-east of Buda, and 55 south-west of Cassovia. E. Long. 20. 10. N. Lat. 48. 10.

AGRICOLA, **CNÆUS JULIUS**, born at Frejus in Provence, was, in Vespasian's time, made lieutenant to Vettius Bolanus in Britain; and upon his return, was ranked by that emperor among the patricians, and made governor of Aquitania. This post he held three years; and upon his return was chosen consul, and afterward appointed governor of Britain, where he greatly distinguished himself. He reformed many abuses occasioned by the avarice or negligence of former governors, put a stop to extortion, and caused justice to be impartially administered. Vespasian dying about this time, his son Titus, knowing the great merit of Agricola, continued him in the government. In the spring, he marched towards the north, where he made some new conquests, and ordered forts to be built for the Romans to winter in. He spent the following winter in concerting schemes to bring the Britons to conform to the Roman customs. He thought the best way of diverting them from rising and taking arms, was to soften their rough manners, by proposing to them new kinds of pleasure, and inspiring them with a desire of imitating the Roman manners. Soon after this, the country was adorned with magnificent temples, porticos, baths, and many other fine buildings. The British nobles had at length their sons educated in learning; and they who before had the utmost aversion to the Roman language, now began to study it with great assiduity: they wore likewise the Roman habit; and, as Tacitus observes, they were brought to consider those things as marks of politeness, which were only so many badges of slavery. Agricola, in his third campaign, advanced as far as the Tweed; and in his fourth, he subdued the nations betwixt the Tweed and the friths of Edinburgh and Clyde, into which the rivers

Glotta and Bodotria discharge themselves; and here he built fortresses to shut up the nations yet unconquered. In his fifth, he marched beyond the friths; where he made some new acquisitions, and fixed garrisons along the western coasts, over against Ireland. In his sixth campaign he passed the river Bodotria, ordering his fleet, the first which the Romans ever had in those parts, to row along the coasts, and take a view of the northern parts. In the following spring, the Britons raised an army of 30,000 men; and the command was given to Galgacus, who, according to Tacitus, made an excellent speech to his countrymen on this occasion. Agricola likewise addressed his men in very strong and eloquent terms. The Romans gained the victory, and 10,000 of the Britons are said to have been killed. This happened in the reign of the emperor Domitian; who, growing jealous of the glory of Agricola, recalled him, under pretence of making him governor of Syria. Agricola died soon after; and his death is suspected to have been occasioned by poison given him by that emperor. Tacitus the historian married his daughter, wrote his life, and laments his death in the most pathetic manner.

AGRICOLA, *George*, a German physician, famous for his skill in metals. He was born at Glaucha, in Misnia, the 24th of March 1494. The discoveries which he made in the mountains of Bohemia, gave him so great a desire of examining accurately into every thing relating to metals, that though he had engaged in the practice of physic at Joachimsthal by advice of his friends, he still prosecuted his study of fossils with great assiduity; and at length removed to Chemnitz, where he entirely devoted himself to this study. He spent in pursuit of it the pension he had of Maurice duke of Saxony, and part of his own estate; so that he reaped more reputation than profit from his labours. He wrote several pieces upon this and other subjects; and died at Chemnitz the 21st of November 1555, a very firm Papist. In his younger years he seemed not averse to the Protestant doctrine; and he highly disapproved of the scandalous traffic of indulgences, and several other things in the church of Rome. The following lines of his were posted up in the streets of Zwickaw, in the year 1719:

*Si nos injecta salvebit cystula nummo,
Heu nimium infelix tu mihi, pauper, eris!
Si nos, Christe, tua servatos morte beasti,
Tam nihil infelix tu mihi, pauper, eris.*

If wealth alone salvation can procure,
How sad a fate for ever waits the poor!
But if thou, Christ, our only saviour be,
Thy merits still may bless ev'n poverty!

In the latter part of his life, however, he had attacked the Protestant religion: which rendered him so odious to the Lutherans, that they suffered his body to remain unburied for five days together; so that it was obliged to be removed from Chemnitz to Zeits, where it was interred in the principal church.

AGRICOLA, *John*, a Saxon divine, born at Eisleben in 1492. He went as chaplain to Count Mansfeld, when that nobleman attended the elector of Saxony to the diet of Spire in 1526, and that of Augsburg in 1530. He was of a restless, ambitious temper, rivalled and

Agricola.

wrote.

Agricola. wrote against Melancthon, and gave Count Mansfeld occasion to reproach him severely. He obtained a professorship at Wittenberg, where he taught particular doctrines, and became founder of the sect of Antinomians; which occasioned warm disputes between him and Luther, who had before been his very good friend. But though he was never able to recover the favour

either of the elector of Saxony or of Luther, he received some consolation from the fame he acquired at Berlin: where he became preacher at court; and was chosen in 1548, in conjunction with Julius Phlug and Michael Heldingus, to compose the famous *Interim*, which made so much noise in the world. He died at Berlin in 1566.

Agricola.

A G R I C U L T U R E.

¹ Definition. **A**GRICULTURE in general, or in the abstract, may be defined to be, The art of making the earth to produce in large quantities, and in the greatest perfection of which their nature is capable, those vegetables which are necessary to the subsistence, or useful for the accommodation, of mankind. Agriculture differs from gardening in this respect, that the gardener is chiefly occupied in rearing small quantities of the nicer and more delicate vegetables, which are rather valued as objects of luxury than as articles of food, whereas the agriculturist labours upon a larger scale, with a view to supply himself and his countrymen with the necessaries of life.

² Differs from gardening. In civilized societies agriculture, or the cultivation of the soil, becomes a separate business or employment; and agriculturists, or the persons engaged in agriculture, receive the appellation of *farmers* or *husbandmen*.

³ Is a separate art. To enable the agriculturist or husbandman to conduct his business with success, it is necessary that he should not confine his attention to the mere cultivation of the soil, or the rearing of vegetables. The vegetables which are capable of affording a comfortable subsistence to the human constitution are few in number; and it has been found by experience, that they cannot be profitably sown and reproduced year after year upon the same spot of ground. Hence it becomes necessary at times to rear upon it grasses or other vegetables which are unfit for affording nourishment to man. But although men cannot eat grass, they may, nevertheless, contrive to obtain subsistence from it in an indirect manner. They may give it to cattle, whose ordinary and natural food it is; and having thus, as it were, converted the grass into the flesh of animals, they can devour these animals; and in this way, obtain a richer and more stimulating food than any vegetable production can possibly afford: It is therefore a part of the business of the husbandman to rear and to feed those animals which are used as food in the society of which he is a member, that he may be enabled at all times to derive profit from the portion of territory that he cultivates. It is also necessary towards conducting his operations with success, that he should rear and feed other animals, not as a source of human subsistence, but for the sake of the services which they are capable of affording; for it has pleased the beneficent Contriver of this world, to place upon it beings of a subordinate nature, capable of assisting mankind in their labours without being degraded by the state of servitude in which they are placed. To the cultivators of the soil, these animals, from their strength and patience of labour, are particularly useful, and

even absolutely necessary in our cold and barren climates. They must therefore be fed and lodged with the greatest care.

Hence, the employment of the husbandman is of an extensive nature, requiring much foresight, and a considerable knowledge of the relations that subsist between the most important objects in nature—the soil, the seasons, the animals, and the plants, so far as they are connected with the subsistence of mankind. It is by bringing to perfection this art that man becomes truly the lord of the universe. He subdues by his operations every part of the surface of the earth, and acquires over the animals which inhabit it, a solid right of dominion or of property, in consequence of having reared, and afforded them subsistence by his skill and his labour. He uses them indeed as food; but before he can do so, he must first bestow upon them subsistence, attend to their multiplication, and to their health and welfare. As they possess no foresight, the purpose to which they are destined, is to them no evil.

It is only in proportion to the degree in which this important art of agriculture has flourished, that nations have been, or ever can be, permanently prosperous. Every improvement that is made in it is a moral benefit conferred upon mankind; for by increasing the quantity of human food, or facilitating the production of it, one of two things must always happen: Either the number of our species will be increased, that is to say, a greater multitude of rational and intelligent beings will exist in the creation; or a greater number of those who already exist, will find leisure for the improvement of their intellectual characters by studying and carrying to perfection the sciences and arts. Thus, the strength of nations is increased in proportion to the degree in which their soil is skilfully cultivated, and their independence is secured by finding upon the spot which they inhabit all that is necessary for their subsistence.

It is a fortunate circumstance, that the art of the husbandman, which is the foundation of all others, and at all times indispensable to human existence, is in every respect conducive to the welfare of those engaged in it. The practice of it bestows health upon the body; and by the variety of occupations which it affords, it also bestows a considerable degree of reflection upon the minds of the lowest persons occupied in it; while, at the same time, it prevents their acquiring that spirit of artifice and of cunning, which in all countries is apt to degrade the character of those engaged in the inferior branches of commercial employment. Nor does it fail, in all ranks and conditions of life, to produce a more candid and liberal character than any other employment.

⁵ Importance of the art.
⁶ Its advantages to those who practise it.

ployment. No British husbandman has ever refused, or even hesitated to allow to be communicated to the public every branch of his art, and every improvement which he and his forefathers may have made in it; whereas, in all the branches of manufacture or of commerce, every transaction, as far as possible, is covered with a mysterious veil of secrecy, and every improvement, as far as possible, is concealed by its inventor, and sometimes undoubtedly perishes with him.

7
History.

The antiquity of this art is undoubtedly beyond that of all others; for we are informed by Scripture, that Adam was sent from the garden of Eden to till the ground; and, this being the case, he certainly must have known how to do so.—It would be ridiculous, however, to imagine that he was acquainted with all the methods of plowing, harrowing, fallowing, &c. which are now made use of; and it would be equally so to suppose, that he used such clumsy and unartful instruments as wooden hooks, horns of oxen, &c. to dig the ground, which were afterwards employed for this purpose by certain savages: but as we know nothing of the particular circumstances in which he was situated, we can know as little concerning his method of agriculture.

The prodigious length of life which the antediluvians enjoyed, must have been very favourable to the advancement of arts and sciences, especially agriculture, to which it behoved them to apply themselves in a particular manner, in order to procure their subsistence. It is probable, therefore, that, even in the antediluvian world, arts and sciences had made great progress, nay, might be farther advanced in some respects than they are at present. Of this, however, we can form no judgment, as there are no histories of those times, and the Scripture gives us but very slight hints concerning these matters.

No doubt, by the terrible catastrophe of the flood, which overwhelmed the whole world, many sciences would be entirely lost, and agriculture would suffer; as it was impossible that Noah or his children could put in practice, or perhaps know, all the different methods of cultivating the ground that were formerly used. The common methods, however, we cannot but suppose to have been known to him and his children, and by them transmitted to their posterity: so that as long as mankind continued in one body without being dispersed into different nations, the arts, agriculture especially, would necessarily advance; and that they did so, is evident from the undertaking of the tower of Babel. It is from the dispersion of mankind consequent upon the confusion of tongues, that we must date the origin of savage nations. In all societies where different arts are cultivated, there are some persons who have a kind of general knowledge of most of those practised through the whole society, while others are in a manner ignorant

every one of them. If we suppose a few people of understanding to separate from the rest, and become the founders of a nation, it will probably be a civilized one, and the arts will begin to flourish from its very origin; but, if a nation is founded by others whose intellects are in a manner callous to every human science (and of this kind there are many in the most learned countries), the little knowledge or memory of arts that were among the original founders will be lost, and such a people will continue in a state of barbarism for many

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ages, unless the arts be brought to them from other nations.

From this, or similar causes, all nations of equal antiquity have not been equally savage, nor is there any solid reason for concluding that all nations were originally unskilled in agriculture; though as we know not the original instruments of husbandry used by mankind when living in one society, we cannot fix the date of the improvements in this art. Different nations have always been in a different state of civilization; and agriculture, as well as other arts, has always been in different degrees of improvement among different nations at the same time.

From the earliest accounts of the eastern nations, we have reason to think, that agriculture has at all times been understood by them in considerable perfection; seeing they were always supplied not only with the necessaries, but the greatest luxuries of life.

As soon as the descendants of Abraham were settled in Palestine, they generally became husbandmen, from the chiefs of the tribe of Judah to the lowest branch of the family of Benjamin. High birth or rank did not at that time make any distinction, for agriculture was considered as the most honourable of all employments; witness the illustrious examples of Gideon, Saul, and David.

The Chaldeans, who inhabited the country where agriculture had its birth, carried that valuable art to a degree of excellence unknown in former times. They cultivated their lands with great assiduity, and seem to have found out some means of restoring fertility to an exhausted soil, by having plentiful harvests in succession; on which account they were not obliged, as their predecessors had been, to change their situations, in order to obtain a sufficiency for themselves and their numerous flocks and herds.

The Egyptians, who, from the natural fertility of their country by the overflowing of the Nile, raised every year vast quantities of corn, were so sensible of the blessings resulting from agriculture, that they ascribed the invention of that art to Osiris. They also regarded Isis, their second deity, as the discoverer of the use of wheat and barley, which before grew wild in the fields, and were not applied by that people to the purposes of food. Their superstitious gratitude was carried so far, as to worship those animals which were employed in tillage; and even the produce of their lands, as leeks, onions, &c.

The divine honours paid to Bacchus in India were derived from the same source, he being considered in that country as the inventor of planting vineyards, and the other arts attendant upon agriculture.

It is also related of the ancient Persians, on the most respectable authority, that their kings laid aside their grandeur once every month to eat with husbandmen. This is a striking instance of the high estimation in which they held agriculture; for at that time arts were practised among that people in great perfection, particularly those of weaving, needle-work, and embroidery. The precepts of their religion taught by their ancient magi, or priests, included the practice of agriculture. The *saint* among them was obliged to work out his salvation by pursuing all the labours of agriculture: And it was a maxim of the Zendavesta, that he who sows the ground with care and diligence, acquires a greater

O o degree

degree of religious merit, than he could have gained by the repetition of ten thousand prayers.

The Phœnicians, so well known in Scripture by the name of *Philistines*, were also remarkable for their attention to, and skill in agriculture. But finding themselves too much disturbed and confined by the incursions and conquests of the Israelites, they spread themselves throughout the greatest part of the Mediterranean islands, and carried with them their knowledge in the arts of cultivation.

Mago, a famous general of the Carthaginians, is said to have written no less than 28 books on the subject; which Columella tells us were translated into Latin by the express order of the Roman senate. We are informed by the ancient writers, that Ceres was born in Sicily, where she first invented the arts of tillage and of sowing corn. For this essential service, she was, agreeable to the superstition of those ages, deified and worshipped as the goddess of plenty. The truth of this is, that in the time of Ceres, the island, through her endeavours and the industry of the people, became very fruitful in corn; and agriculture was there esteemed so honourable an employment, that even their kings did not disdain to practise it with their own hands.

But time, which at first gave birth to arts, often caused them to be forgotten when they were removed from the place of their origin. The descendants of Noah, who settled in Europe, doubtless carried their knowledge of agriculture with them into the regions which they successively occupied. But those who took possession of Greece were such an uncivilized race, that they fed on roots, herbs, and acorns, after the manner of beasts. Pelasgus had taught them the culture of the oak, and the use of acorns as food; for which service, we are told, divine honours were paid him by the people.

The Athenians, who were the first people that acquired any tincture of politeness, taught the use of corn to the rest of the Greeks. They also instructed them how to cultivate the ground, and to prepare it for the reception of the seed. This art, we are told, was taught them by Triptolemus. The Greeks soon perceived that bread was more wholesome, and its taste more delicate, than that of acorns and the wild roots of the fields; accordingly they thanked the gods for such an unexpected and beneficial present, and honoured their benefactor.

As the arts of cultivation increased, and the blessings they afforded became generally experienced, the people soon preferred them to whatever the ravages of conquest, and the cruel depredations of savage life, could procure. And accordingly we find, that the Athenian kings, thinking it more glorious to govern a small state wisely, than to aggrandize themselves, and enlarge the extent of their dominions by foreign conquests, withdrew their subjects from war, and mostly employed them in cultivating the earth. Thus, by continued application, they brought agriculture to a considerable degree of perfection, and soon reduced it to an art.

Hesiod was the first we know of among the Greeks who wrote on this interesting subject. According to the custom of the Oriental authors, he wrote in poetry, and embellished his poem with luxuriant description

and sublime imagery. He calls his poem *Works and Days*, because agriculture requires exact observations on times and seasons.

Xenophon has also, in his *Oeconomics*, remarked, that agriculture is the nursing mother of the arts. For, says he, "where agriculture succeeds prosperously, there the arts thrive; but where the earth necessarily lies uncultivated, there the other arts are destroyed."

Other eminent Greek writers upon agriculture were, Democritus of Abdera, Socraticus, Archytas Tarentinus, Aristotle, and Theophrastus, from whom the art received considerable improvements.

The ancient Romans esteemed agriculture so honourable an employment, that the most illustrious senators of the empire, in the intervals of public concerns, applied themselves to this profession; and such was the simplicity of those ages, that they assumed no appearance of magnificence and splendour, or of majesty, but when they appeared in public. At their return from the toils of war, the taking of cities, and the subduing of hostile nations, their greatest generals were impatient till they were again employed in the arts of cultivation.

Regulus, when in Africa, requested of the senate to be recalled, lest his farm might suffer, for want of proper cultivation, in his absence; and the senate wrote him for answer, that it should be taken care of at the public expence, while he continued to lead their armies.

Cato the censor, after having governed extensive provinces, and subdued many warlike nations, did not think it below his dignity to write a *Treatise on Agriculture*. This work (as we are told by Servius) he dedicated to his own son, it being the first Latin treatise written on this important subject; and it has been handed down to us in all its purity, in the manner that Cato wrote it.

Varro composed a treatise on the same subject, and on a more regular plan. This work is embellished with all the Greek and Latin erudition of that learned author, who died 28 years before the commencement of the Christian era. Virgil who lived about the same time, has, in his *Georgics*, adorned this subject with the language of the Muses, and finely illustrated the precepts and rules of husbandry left by Hesiod, Mago, and Varro.

Columella, who flourished in the reign of the emperor Claudius, wrote 12 books on husbandry, replete with important instruction.

From this period to that of the reign of Constantine Paganatus, husbandry continued in a declining state; but that wise emperor caused a large collection of the most useful precepts relating to agriculture to be extracted from the best writers, and published them under the title of *Geoponics*. It has been asserted, that he made this collection with his own hand; and the truth of the assertion is not improbable, as it is well known, that after he had conquered the Saracens and the Arabians, he not only practised and encouraged, but studied the arts of peace, fixing his principal attention on agriculture, as their best foundation.

After the death of Constantine, however, the increasing attention of the people to commerce, and the ignorance and gross superstition of the ages which succeeded, seem to have rendered agriculture an almost neglected

glected science. The irruptions of the northern nations soon abolished any improved system. These innumerable and enterprising barbarians, who overran all Europe, were originally shepherds or hunters, like the present Tartars and the savages of America. They contented themselves with possessing, without labour or trouble, those vast countries rendered deserts by their own ravages, cultivating only a very small spot near their habitations; and in this trifling husbandry only the meanest slaves were employed: so that the art itself, which formerly was thought worthy of the study of kings, was now looked upon as mean and ignoble; a prejudice which is scarcely effaced at present, or at least but very lately.—During this period, therefore, we find no vestiges of any thing tolerably written on the subject. No new attempts were made to revive it, or to improve it, till the year 1478, when Crescenzio published an excellent performance on the subject at Florence. This roused the slumbering attention of his countrymen, several of whom soon followed his example. Among these, Tatti, Stefano Augustino Gallo, Sanfiovino, Lauro, and Tarello, deserve particular notice.

At what time agriculture was introduced into Britain, is uncertain. When Julius Cæsar first invaded this island, it was not wholly unknown. That conqueror was of opinion, that agriculture was first introduced by some of those colonies from Gaul which had settled in the southern parts of Britain, about 100 years before the Roman invasion*.

* Cæsar de
Bell. Gall.
lib. v. c. 12.

It is not to be expected that we can now be acquainted with many of the practices of these ancient husbandmen. It appears, however, that they were not unacquainted with the use of manures, particularly marl. This we have on the authority of Pliny†, who tells us, that it was peculiar to the people of Gaul and of Britain; that its effects continued 80 years; and that no man was ever known to marl his field twice, &c.—It is highly probable, too, that lime was at this time also used as a manure in Britain, it being certainly made use of in Gaul for this purpose at the time of Julius Cæsar's invasion.

† Plin.
Nat. Hist.
lib. xvii.
cap. 6.

The establishment of the Romans in Britain produced great improvements in agriculture, inasmuch that prodigious quantities of corn were annually exported from the island; but when the Roman power began to decline, this, like all the other arts, declined also, and was almost totally destroyed by the departure of that people. The unhappy Britons were now exposed to frequent incursions of the Scots and Picts, who destroyed the fruits of their labours, and interrupted them in the exercise of their art. After the arrival of the Saxons in the year 449, they were involved in such long wars, and underwent so many calamities, that the husbandmen gradually lost much of their skill, and were at last driven from those parts of their country which were most proper for cultivation.

After the Britons retired into Wales, though it appears from the laws made relative to this art, that agriculture was thought worthy of the attention of the legislature, yet their instruments appear to have been very unartful. It was enacted that no man should undertake to guide a plough who could not make one; and that the driver should make the ropes of twisted willows, with which it was drawn. It was usual for six or eight persons to form themselves into a society for fitting out

one of these ploughs, providing it with oxen and every thing necessary for ploughing; and many minute and curious laws were made for the regulation of such societies. If any person laid dung on a field with the consent of the proprietor, he was by law allowed the use of that land for one year. If the dung was carried out in a cart in great abundance, he was to have the use of the land for three years. Whoever cut down a wood, and converted the ground into arable, with the consent of the owner, was to have the use of it for five years. If any one folded his cattle, for one year, upon a piece of ground belonging to another, with the owner's consent, he was allowed the use of that field for four years.

Thus, though the Britons had in a great measure lost the knowledge of agriculture, they appear to have been very assiduous in giving encouragement to such as would attempt a revival of it; but, among the Anglo-Saxons, things were not at present in so good a state. These restless and haughty warriors, having contracted a distaste and contempt for agriculture, were at pains to enact laws to prevent its being followed by any other than women and slaves. When they first arrived in Britain, they had no occasion for this art, being supplied by the natives with all the necessaries of life. After the commencement of hostilities, the Saxons subsisted chiefly by plunder: but having driven out or extirpated most of the ancient Britons, and divided their lands among themselves, they found themselves in danger of starving, there being now no enemy to plunder: and therefore they were obliged to apply to agriculture.

The Saxon princes and great men, who, in the division of the lands, had received the greatest shares, are said to have subdivided their estates into two parts, which were called the *in-lands* and the *out-lands*. The in-lands were those which lay most contiguous to the mansion-house of their owner, which he kept in his own possession, and cultivated by his slaves, under the direction of a bailiff, for the purpose of raising provisions for the family. The out-lands were those at a greater distance from the house, and were let to the *ceorls*, or farmers of those times, at very moderate rents. By the laws of Ina king of the West Saxons, who reigned in the end of the seventh and beginning of the eighth century, a farm consisting of ten hides, or plough-lands, was to pay the following rent: "Ten casks of honey; three hundred loaves of bread; twelve casks of strong ale; thirty casks of small ale; two oxen; ten widders; ten geese; twenty hens; ten cheeses; one cask of butter; five salmon; twenty pounds of forage; and one hundred eels." From this low rent, the imperfection of agriculture at that time is easily discoverable; but it is still more so from the low prices at which land was then sold. In the ancient history of the church of Ely, published by Dr Gale, there are accounts of many purchases of lands by Ædelwold the founder of that church, and by other benefactors, in the reign of Edgar the Peaceable, in the tenth century. By a comparison of these accounts it appears, that the ordinary price of an acre of the best land in that part of England, in those times, was no more than 16 Saxon pennies, or about four shillings of our money: a very trifling price, even in comparison with that of other commodities at the same time: for, by

comparing other accounts, it appears, that four sheep were then equal in value to an acre of the best land, and one horse of the same value with three acres. The frequent and deplorable famines which afflicted England about this time, are further instances of the wretched state of agriculture. In 1043, a quarter of wheat sold for 60 Saxon pennies (15 of our shillings), at that time equal in value to seven or eight pounds of our money now.

The invasion of the Normans, in 1066, contributed very much to the improvement of agriculture; for, by that event, many thousands of husbandmen from Flanders, France, and Normandy, settled in Britain, obtained estates or farms, and cultivated them after the manner of their country. The implements of husbandry, used at this time, were of the same kind with those employed at present; but some of them were less perfect in their construction. The plough, for example, had but one stilt or handle, which the ploughman guided with one hand, having in his other hand an instrument which served both for cleaning and mending the plough, as well as for breaking the clods. The Norman plough had two wheels; and in the light soil of Normandy was commonly drawn by one or two oxen; but, in England, a greater number was often necessary. In Wales, the person who conducted the oxen in the plough walked backwards. Their carts, harrows, scythes, sickles, and flails, from the figures of them still remaining, appear to have been nearly of the same construction with those that are now used. In Wales, they did not use a sickle for reaping their corns, but an instrument like the blade of a knife, with a wooden handle at each end.—Their chief manure next to dung, seems still to have been marl. Summer fallowing of lands designed for wheat, and ploughing them several times, appear to have been frequent practices of the English farmers in this period.

We are, after all, very much in the dark with respect to the state and progress of agriculture in Great Britain previous to the fourteenth century. That it was pretty generally practised, especially in the eastern, south, and midland parts of England, is certain; but of the mode, and the success, we are left almost totally ignorant. In the latter end of the fifteenth century, however, it seems to have been cultivated as a science, and received very great improvement.

At this time our countryman Fitzherbert, judge of the common-pleas, shone forth with distinguished eminence in the practical parts of husbandry. He appears to have been the first Englishman who studied the nature of soils and the laws of vegetation with philosophical attention. On these he formed a theory confirmed by experiments, and rendered the study pleasing as well as profitable, by realizing the principles of the ancients, to the honour and advantage of his country. Accordingly, he published two treatises on this subject: the first, entitled *The Book of Husbandry*, appeared in 1534; and the second, called *The Book of Surveying and Improvements*, in 1539. These books, being written at a time when philosophy and science were but just emerging from that gloom in which they had long been buried, were doubtless replete with many errors; but they contained the rudiments of true knowledge, and revived the study and love of an art, the advantages of which were obvious to men of the least reflection. We there-

fore find that Fitzherbert's books on agriculture soon raised a spirit of emulation in his countrymen; and many treatises of the same kind successively appeared, which time has however deprived us of, or at least they are become so very scarce as only to be found in the libraries of the curious.

About the year 1600, France made some considerable efforts to revive the arts of husbandry, as appears from several large works, particularly *Les Moyens de devenir Riche*; and the *Cosmopolite*, by Bernard de Palissy, a poor porter, who seems to have been placed by fortune in a station for which nature never intended him; *Le Theatre d'Agriculture*, by Deferres; and *L'Agriculture et Maison Rustique*, by Messrs Etienne, Liebault, &c.

Nearly in the same period, the skilful practice of husbandry became more prevalent among this people and the Flemings than the publishing of books on the subject. Their intention seemed to be that of carrying on a private lucrative employment, without instructing their neighbours. Whoever therefore became desirous of copying their method of agriculture, was obliged to visit that country, and make his own remarks on their practice.

The principal idea they had of husbandry was, by keeping the lands clean and in fine tilth, to make a farm resemble a garden as nearly as possible.

Such an excellent principle, at first setting out, led them of course to undertake the culture of small farms only, which they kept free from weeds, continually turning the ground, and manuring it plentifully and judiciously. When they had by this method brought the soil to a proper degree of cleanliness, health, and sweetness, they chiefly cultivated the more delicate grasses, as the surest means of obtaining a certain profit upon a small estate, without the expence of keeping many draught horses and servants. A few years experience was sufficient to convince them, that ten acres of the best vegetables for feeding cattle, properly cultivated, would maintain a larger stock of grazing animals than forty acres of common farm grass on land badly cultivated. They also found, that the best vegetables for this purpose were lucerne, saintfoin, trefoil of most kinds, field-turnips, &c.

The grand political secret of their husbandry, therefore, consisted in letting farms on improvement. They are said also to have discovered nine sorts of manure; but what they all were, we are not particularly informed. We find, however, that marl was one of them; the use and virtues of which appear also to have been well known in this kingdom two hundred years ago, although it was afterwards much neglected. They were the first people among the moderns who ploughed in green crops for the sake of fertilizing the soil; and who confined their sheep at night in large sheds built on purpose, the floors of which were covered with sand or virgin earth, &c. which the shepherd carted away each morning to the compost dunghill.

In England, during the civil wars, though the operations and improvements in husbandry suffered some temporary checks, there flourished several excellent writers on the subject, and the art itself received considerable encouragement. Sir Hugh Platt was one of the most ingenious husbandmen of the age in which he lived; yet so great was his modesty, that all his works, except

except his Paradise of Flora, seem to be posthumous. He held a correspondence with most of the lovers and patrons of agriculture and gardening in England; and such was the justice and modesty of his temper, that he always named the author of every discovery communicated to him. Perhaps no man in any age discovered, or at least brought into use, so many new kinds of manure. This will be evident to those who read his account of the compost and covered dunghills, and his judicious observations on the fertilizing qualities lodged in salt, street dirt, and the sillage of streets in great cities, clay, fullers earth, moorish earths, dunghills made in layers, fern, hair, calcination of all vegetables, malt dust, willow tree earth, soapers ashes, urine, marl, and broken potsherds.

Gabriel Plattes may be said to have been an original genius in husbandry. He began his observations at an earlier period, in the reign of Queen Elizabeth, and continued them down to the Commonwealth. But notwithstanding the great merit of this writer, and the essential service he had rendered his country by his writings, the public ungratefully suffered him to starve and perish in the streets of London; nor had he a shirt on his back when he died.

Samuel Hartlib, a celebrated writer on agriculture in the last century, was highly esteemed and beloved by Milton, and other great men of his time. In the preface to his work entitled his *Legacy*, he laments that no public director of husbandry was established in England by authority; and that we had not adopted the Flemish method of letting farms upon improvement. This remark of Hartlib's procured him a pension of 100*l.* a-year from Cromwell; and the writer afterwards, the better to fulfil the intention of his benefactor, procured Dr Beattie's excellent annotation on the *Legacy*, with other valuable papers from his numerous correspondents.

The time in which Hartlib flourished seems to have been an era when the English husbandry rose to great perfection, compared with that of former ages; for the preceding years had impoverished the country gentlemen, and of course made them indolent. They found the cultivation of their own lands to be the most profitable station they could fill. But this wise turn was not of long continuance. At the Restoration, they generally became infected with that intoxication and love of pleasure which succeeded. All their industry and knowledge were exchanged for neglect and dissipation; and husbandry descended almost entirely into the hands of common farmers.

Evelyn was the first writer who inspired his countrymen with a desire of reviving the study of agriculture; and he was followed by the famous Jethro Tull. The former, by his admirable treatises on earth and on planting, and the latter, by showing the superior advantages of the drill husbandry, excited numbers to bring their theory to the test of fair experiment.

Many valuable and capital improvements have since that period been made in English husbandry: and these great men have been succeeded by a variety of writers, many of whom have done essential service, by enlightening the minds of their countrymen, and exciting them to emulation.

About the middle of the last century, Ireland began to make a considerable figure in the art of husbandry.

It must indeed be confessed, that the Irish had very strong prejudices in favour of a wretched method of agriculture, till Blyth opened their eyes by his excellent writings. Since that time, a spirit of improvement has more or less been promoted, and in many instances carried on with great zeal, by the nobility, clergy, and gentry of that kingdom. In proof of this, it will be sufficient to observe, that the Transactions of the Dublin Society for encouraging Husbandry are now cited by all foreigners in their memoirs relating to that subject. And the observations of that discerning and judicious writer, Arthur Young, Esq. in his Tour through that kingdom, show, that in many respects improvements there have of late years made a progress nearly as rapid as in England.

After the peace of Aix-la-Chapelle, most of the nations of Europe, by a sort of tacit consent, applied themselves to the study of agriculture, and continued to do so, more or less, amidst the universal confusion that succeeded.

The French found, by repeated experience, that they could never maintain a long war, or procure a tolerable peace, unless they could raise corn enough to support themselves in such a manner as not to be obliged to submit to harsh terms on the one hand, or to perish by famine on the other. This occasioned the king to give public encouragement to agriculture, and even to be present at the making of several experiments. The great, and the rich of various ranks and stations, followed his example; and even the ladies were candidates for a share of fame in this public-spirited and commendable undertaking.

During the hurry and distresses of France in the war of 1756, considerable attention was paid to agriculture. Prize questions were annually proposed in their rural academies, particularly those of Lyons and Bourdeaux; and many judicious observations were made by the Society for improving agriculture in Brittany.

After the conclusion of that war in 1763, matters were carried on there with great vigour. The university of Amiens made various proposals for the advancement of husbandry; and the marquis de Tournilly (a writer who proceeded chiefly on experience) had the principal direction of a georgical society established at Tours.

The society at Rouen also deserves notice; nor did the king and his ministers think it unworthy their attention. There soon existed about fifteen societies in France, established by royal approbation, for the promoting of agriculture; and these had twenty co-operating societies belonging to them.

About this time vigorous exertions began to be made in Russia to introduce the most approved system of husbandry which had taken place in other parts of Europe. The late empress sent several gentlemen into Britain and other countries to study agriculture, and gave it all possible encouragement in her own dominions.

The art of agriculture has also been for many years publicly taught in the Swedish, Danish, and German universities, where the professors may render essential service to their respective countries, if they understand the practical as well as the speculative part, and can converse with as much advantage with the farmer as with Virgil and Columella.

Even Italy has not been totally inactive. The Neapolitans of this age have condescended to recur to the first rudiments of revived husbandry, and begun to study anew the Agricultural System of Crescenzo, first published in 1478. The people of Bergamo have pursued the same plan, and given a new edition of the *Ricordo d'Agricoltura de Tarello*, first published in 1577. The duchy of Tuscany has imbibed the same spirit of improvement. A private gentleman, above 40 years since, left his whole fortune to endow an academy of agriculture. The first ecclesiastic in the duchy was president of this society, and many of the chief nobility were members.

His Sardinian majesty also sent persons to learn the different modes of practice in foreign countries; and made some spirited attempts to establish a better method of agriculture among his subjects.

In Poland, also, M. de Bielufki, grand marshal of the crown, made many successful attempts to introduce the new husbandry among his countrymen; and procured the best instruments for that purpose from France, England, and other parts of Europe.

The Hollanders are the only people now in Europe who seem to look upon agriculture with indifference. Except the single collateral instance of draining their fens and morasses, they have scarcely paid any attention to it; and even this seems to have proceeded more from the motive of self-preservation, than any love of, or disposition to, husbandry.

In the year 1759, a few ingenious and public-spirited men at Berne in Switzerland established a society for the advancement of agriculture and rural economics. In that society were many men of great weight in the republic, and most of them persons of a true cast for making improvements in husbandry, being enabled to join the practice with the theory.

Nor must we here omit to mention, that the justly celebrated Linnæus and his disciples have performed great things in the north of Europe, particularly in discovering new kinds of profitable and well-tasted food for cattle. About the same time, Sweden bestowed successful labours on a soil which had before been looked upon as cold, barren, and incapable of melioration. Of this the Stockholm Memoirs will be a lasting monument.

Denmark, and many of the courts in Germany, followed the same example. Woollen manufactures were encouraged, and his Danish majesty sent three persons into Arabia Felix to make remarks, and bring over such plants and trees as would be useful in husbandry, building, and rural affairs.

The duchy of Wirtemberg, also, a country by no means unfertile, but even friendly to corn and pasture-age, has contributed its assistance towards the improvement of agriculture, having more than 50 years since published 14 economical relations at Stutgard.

Neither must we forget the very assiduous attention of the learned in Leipzig and Hanover to this important object. During the rage and devastation of a long war, they cultivated the arts of peace; witness the *Journal d'Agriculture* printed at Leipzig, and the *Recueils d'Hanover* printed in that city.

Even Spain, constitutionally and habitually inactive on such occasions, in spite of all their natural indolence, and the prejudices of bigotry, invited Linnæus,

with the offer of a large pension, to superintend a college founded for the purpose of making new inquiries into the history of nature and the art of agriculture.

Among the Japanese, agriculture is in great repute; and among the Chinese it is distinguished and encouraged by the court beyond all other sciences. The emperor of China yearly, at the beginning of spring, goes to plough in person, attended by all the princes and grandees of the empire. The ceremony is performed with great solemnity; and is accompanied with a sacrifice, which the emperor, as high-priest, offers to Chang-Ti, to ensure a plentiful crop in favour of his people.

But, without any improper partiality to our own country, we are fully justified in asserting, that Britain alone exceeds all modern nations in husbandry; and from the spirit which for the last twenty years has animated many of our nobility and gentry, to become the liberal patrons of improvement, there is reason to hope that this most useful of arts will, in a few years, be carried to a greater pitch of perfection than it has ever yet attained in any age or country.—The Royal Society, the Bath Society, and the Society of Arts, &c. in particular, have been signally useful in this respect; and the other associations, which are now established in many parts of the kingdom, co-operate with them in forwarding their laudable design.

It is not, however, to the exertion of public societies, excellent and honourable as they are, that all our modern improvements in agriculture owe their origin. To the natural genius of the people have been added the theory and practice of all nations in ancient and modern times. This accumulated mass of knowledge has been arranged, divided, and subdivided; and after passing the test of practical experiments, the essential and most valuable parts of it have been preserved, improved, and amply diffused in the works of Lord Kames, Mr Young, Stillingfleet, Dr Hunter, Anderson, Dickson, Ellis, Randal, Lisle, Marshall, Mortimer, Duhamel, Bradley, Kent, Mills, and a few other writers upon this great art of rendering mankind happy, wealthy, and powerful.

We also remark with much satisfaction, that the British government has of late years thought fit to render the improvement of agriculture an object of public attention and encouragement, by the institution of a *board of agriculture*.—About the year 1790, Sir John Sinclair, Bart. invited the clergy of the church of Scotland to transmit to him descriptions of the state of their different parishes, with a view to the publication of what is called a *Statistical Account of Scotland*. The whole members of this body having readily complied with his request, a work in 20 volumes octavo was compiled from the materials afforded by them, containing an account of the agriculture, manufactures, and population of the country. The same gentleman, about that period, was also active in obtaining the institution of a private society, called *The British Wool Society*, which was very successful in calling the attention of the public to the improvement of that important article of national growth and manufacture. By these patriotic exertions, having acquired a considerable share of popularity, he was encouraged on 15th May 1793, to make a motion in the house of commons, of which

he was a member, for an address to the crown, recommending the institution of a board of agriculture. The chancellor of the exchequer, Mr Pitt, on perceiving that the proposal was acceptable to the majority of the house, gave it a decided support, and on the 17th May, to which the debate had been adjourned, the motion was carried for an address to his majesty to institute such a board, at an expence not exceeding 3000l.—In consequence of this application, a charter passed the great seal, incorporating the members of administration for the time, with the archbishops of Canterbury and York, and all their successors in office, together with certain other noblemen and gentlemen, into a board or society, by the name of the *Board or Society for the encouragement of Agriculture and internal improvement*, under the patronage of the crown; with power to the members to elect office-bearers and successors to themselves: and in the mean time Sir John Sinclair was appointed to be the first president, to continue in office till 25th March following; Sir John Caul, Bart. was appointed to be the first treasurer, and Edward Young,

Esq. so well known for his agricultural publications, was appointed secretary.

The regular sittings of the board did not commence till 23d January 1794, since which time it has continued to exert a very considerable degree of activity in establishing an extensive foreign correspondence, and in procuring and publishing every kind of useful domestic agricultural intelligence, some specimens of which we shall afterwards have occasion to notice. This board, soon after its institution, also employed persons of known reputation to prepare agricultural surveys of every county in the island of Great Britain.—Many of these surveys have been published, and form treatises upon this important art, which, for extent of intelligence and ability of execution, have not been exceeded in any age or country. The board has also obtained parliamentary rewards to some individuals for important discoveries, and has offered premiums for essays or treatises upon subjects connected with the purpose of its institution, which have produced a great variety of valuable and ingenious disquisitions.

THEORY OF AGRICULTURE.

IN an art that is so necessary to mankind, and that has been so universally practised, it might perhaps be expected, that the principles upon which its operations depend, would have been by this time completely and accurately investigated, and consequently that a correct theory of agriculture could easily be exhibited. This, however, is by no means the case; and it is not a little singular, that, in this most useful of all arts, the theory should still be more defective than in almost any science with which we are acquainted. It is fortunate, however, for the human race, that in most cases, or at least in all important arts, they succeed better in practice than in speculation. During many ages, various artists were accustomed to extract the most ordinary, but most useful metals, from the state of ore or earth in which nature produces them, and to reduce them back from their metallic form and lustre, to a state of ore or earth again. These artists were unacquainted with the principles upon which the success of their operations depended; and it is only within these few years that some ingenious chemists have successfully investigated the nature of these processes, and have explained what they have called the oxygenation and disoxygenation of metals. The same thing has happened in agriculture. Men have often cultivated the ground well, while they have speculated ill concerning the mode of doing so.

Various reasons render it still more difficult to form a complete theory of agriculture, than of chemistry, mechanics, or other arts. In agriculture, an experiment cannot be made in an instant, or even in an hour, or in a day or two. A whole season must pass away before a single experiment can be performed, and after all, as in other arts, the inquirer after truth may be misled by some unobserved circumstances. Some fact, quite foreign to the experiment itself, arising out of the peculiar state of the soil, or of the train of seasons, may produce plentiful crops for a year or two, though, in ordinary circumstances, no such effect would follow; and the ingenious contriver of the experiment, who thought he had made an important discovery, may af-

terwards derive from it only disappointment and mortification. But human life is too short to admit of a very great variety of agricultural experiments to be performed by the same individual. After a few seasons, he must leave his place to be occupied by a new inquirer, possessed of a different character and of different views. Unfortunately, till of late years, it was not usual for husbandmen to publish, and thus to immortalize and diffuse over whole nations, the result of their private experience and reflections. Scattered over the face of great countries, and having little intercourse with foreigners, or even with each other, they knew little of what was done by men engaged in the same profession, though at no great distance.—In this way, the benefit of local discoveries was not communicated to the world at large, nor was an opportunity afforded of eradicating local prejudices and erroneous practices. As the state of this valuable profession is now rapidly altering in these respects, there is little doubt that we are fast approaching towards a period at which it will be possible to exhibit a clear and correct theory of agriculture, or to arrange under a few simple heads the rules or principles upon which the practice of the art depends.—What we are now to offer, is not to be considered as perfect, nor even as possessing any nearer approximation towards a perfect theory of the husbandman's art; but merely, such a general statement of its principles as results from the degree of information hitherto collected upon the subject.

A theory, or general view of the principles of agriculture seems necessarily to resolve itself into the two following investigations: 1st, To inquire among the great variety of vegetables that exist in nature, what particular plants ought to be regarded as most worthy of cultivation: and 2dly, To consider the best mode of cultivating with success the plants thus selected.

With regard to the first of these divisions of the subject, or the vegetables that ought to be chosen as most valuable and worthy of cultivation, it may be observed, that the value of a plant is of two kinds, *absolute*, or *relative*:

10
The theory of agriculture is defective.

11
Difficulty of forming it.

12
What it ought to contain.

13
The value of vegetables is absolute and relative.

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relative: The *absolute* value of a plant depends upon its fitness to afford subsistence to the human species, whereas its *relative* value consists of the tendency which the cultivation of it will have to enrich a particular husbandman, or class of husbandmen, either because their lands are well adapted for its growth, or because there is a ready market for it in the vicinity, where it bears a high price.

14
They are
useful di-
rectly and
indirectly.

Concerning the absolute value of plants, or their tendency to afford subsistence to mankind, it is to be observed, that some plants are *directly* useful or valuable, because they are immediately consumed as food by man, such as wheat, oats, or potatoes; whereas mankind derive subsistence from another class of plants, only in an *indirect* manner, by giving them to cattle, and afterwards eating the flesh of these cattle, as happens with regard to grass and straw of all kinds.

SECT. I. Of Vegetables to be cultivated as Food for Man.

15
Men feed
on fruits
and roots.

SOME vegetables afford subsistence to the human species by means of the fruit that grows upon them, which hangs, and is brought to maturity in the air, at the summit of their stems. Other vegetables derive their value from producing roots which come to maturity in the bosom of the soil, and are dug from thence to be consumed by mankind.

16
Fruit trees
not fruited
to for food,

Of fruit-bearing vegetables, those called trees, which rise aloft with a strong trunk, are the most permanent and remarkable. It is said that a spot of ground, occupied by some kinds of trees such as chestnuts or dates, is capable of producing a very great portion of food, useful for the support of the human species. One advantage attending the cultivation of such vegetables, would be that, after the trees are planted, and secured by fences for a few years against animals, they would for ever after, or at least for many years, continue to grow and flourish without care or labour. It does not appear, however, that in any nation of ancient or modern times, forests of fruit-bearing trees have been reared with a view to afford subsistence to the community. For this two reasons may be assigned. In the first place, a considerable number of years must elapse, before such plants could arrive at maturity, and fulfil the purpose of their destination. Of whatever use therefore they might be to future ages, it is evident that they could afford little benefit to the generation which planted them. But in a question about subsistence, mankind are usually under the necessity of considering their own immediate wants, and hence they have been led to the cultivation of such plants, as afford the most speedy reward for the efforts of their industry. Another reason for preferring the culture of small annual plants, to the greater and more permanent productions of nature, would arise, in the early ages of the world, from the turbulent state of society and the frequency of wars. A community that should depend for its subsistence upon the fruit of forest trees, might be ruined for half a century by the inroad of an enemy. An example of this was exhibited in the war between Great Britain, and her North American colonies. When the parent state hired the savages on the western frontier, to join her party and to make inroads upon the colonists, the latter retaliated upon the savages in the following manner. Several of the colonies united

17
because
they ripen
slowly, and
are de-
stroyed in
war.

in sending an expedition against the Indians. The bodies of militia employed upon this expedition, were surprised to find small corn fields around a considerable number of the Indian hamlets. They were not satisfied however with destroying the huts of the natives, and these incipient efforts of savage industry; but they anxiously sought out and destroyed every fruit-bearing tree that they found in their progress of almost a thousand miles, thereby rendering the wilderness utterly uninhabitable to a people destitute of agriculture, and who could not always depend for subsistence upon their success in hunting. From this example we see that the frequent wars arising from the barbarous character of ancient nations, would compel them to seek subsistence, not from the fruit of forest trees, but from grain which speedily arrives at maturity, and which when destroyed can soon be renewed. Thus war becomes a less wasteful scourge to the human race, and communities are enabled speedily to recover from the devastation which it produces. Had the nations of Europe depended for subsistence, upon any fruits which could not be speedily restored when destroyed, it is evident, that, in the late sanguinary conflict, the greater number of them must have been irretrievably ruined.

Hence it appears that the cultivation of plants of annual growth, as a source of subsistence, is favourable to the permanence of civilization in the world; and that before nations can venture to rely for their subsistence upon the fruit of plants of slower growth, their character must have arrived at a degree of moral amelioration far superior to what it has ever been known to possess.

Of annual plants cultivated for fruit, wheat has always been accounted the most valuable. This has probably arisen from the extreme facility with which the flour of it undergoes a process of fermentation, which renders it capable of becoming a more light and agreeable kind of bread than the flour of any other grain. This quality is believed to arise from a quantity of a substance contained in wheat that is of the same nature with the gluten, or glue, that is prepared from animal bodies. In other respects, however, it does not appear that wheat is more valuable than some other kinds of grain; by means of long boiling a given weight of barley, or even of oats, will render a quantity of water as thick or full of mucilage as can be done by the same weight of wheat.

It may not be improper here to remark, that, in modern times, an author of no mean reputation, has arisen, who endeavours to prove that wheat ought not to be cultivated, nor bread to be eaten. This is M. Linguet, who has written a treatise expressly upon the subject; and, ridiculous as the assertion may seem, it has been thought worthy of a formal refutation by Dr Tissot.— One of M. Linguet's arguments is, that wheat impoverishes the ground on which it grows: but in opposition to this, Dr Tissot argues, that corn is more easily cultivated than grass; and that consequently in the country he speaks of (Switzerland), the best fields are appropriated to hay, and the worst to corn. "If there are some districts of very poor land (says he) almost entirely sown with corn, they are not poor because they produce only corn, but because they are not fit to produce any thing else. Their soil is so bad, that they can grow but very little fodder: consequently they maintain only such cattle as are absolutely necessary for labour;

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18
Men rather
trust to
grain.

19
The use of
grain has
been ob-
jected to.

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labour; and those are ill fed, and frequently perish. They have but little manure, and their crops are small; for large crops of all sorts can only be expected from lands naturally rich or strongly manured. Thus the poverty of the inhabitants is only owing to their possessing an ungrateful soil. What proves evidently that it is the natural soil which is in the fault, and not the corn which impoverishes it, is, that where there is meadow and arable land, the price of the meadow land is much more considerable than that of the arable. In most parts of this country the proportion is nearly ten to one; and there are even some meadows, for one part of which they would give 30 of field lands; and some of vines, for which 100 of arable would be given. Those districts where the soil will produce nothing but corn, are poor; but in those which furnish fodder, and also fine crops of grain, the inhabitants are wealthy and happy, unless they are oppressed by taxes."

M. Linguet draws another objection from the length of time required to cultivate wheat: but Tiffot, by another calculation, shows, that 48 days work throughout the year would cultivate more wheat than is sufficient for a family of six persons. The time necessary for cultivation of arable land also does not increase in proportion to its extent; but in case more is cultivated than is requisite for the subsistence of the family, a trade is formed, which might be increased to an unlimited extent. He then compares the time requisite for the cultivation of vines, which are recommended by M. Linguet, and finds it to be much longer than that required for wheat. "I know very well (says he) that the one requires cattle, and the other does not: but these cattle, far from being expensive, will, if properly managed, increase the gain of the farmer: therefore they must not be looked upon as any expence. Corn is subject to many accidents, but vines are subject to many more: those which the vines suffer, sometimes spoil the vintage for several years; whereas those which happen to arable land, only spoil the crop for the season; and as the expence of cultivating vines, for which only manual labour can be employed, is much more considerable, therefore the *vignerons* (or person who cultivates vines), who engages more largely than the farmer, will consequently be a much greater loser if unsuccessful.—Hay is also subject to frequent and very disagreeable accidents; the securing it is sometimes very difficult; and, when it is badly made, it is very hurtful to cattle.—A single fact will be sufficient to prove the casualties to which hay is subject; viz. that it varies in price as much as grain. Accidents of hay mows taking fire are but too frequent: and this is not to be feared in corn mows."

The other objections of M. Linguet to wheat appear to be quite frivolous; so that concerning the cultivation of this grain, Dr Tiffot draws the following conclusions: "It appears then, from what has been said, that wheat is not a commodity that is impoverishing in itself; and that this grain will grow indifferently at least in lands and situations which are unfavourable to other plants. This grain is likewise adapted to most climates; and if there are districts almost entirely sown with wheat, and yet poor, it is the fault of the soil, and not of this useful grain."

But the most extraordinary argument perhaps ever thought of on this subject is M. Linguet's assertion,

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that the use of wheat, or bread made from it, is detrimental to population; and that the countries where this grain is cultivated are poor and thinly inhabited, whereas those which abound with vineyards and pasture lands are rich and populous. But this, in Dr Tiffot's opinion, shows only that one soil is more rich than another, and that a fertile soil will maintain most inhabitants. "No person (says he) is more capable of assigning the cause of the subjection of the Roman empire to the northern powers, than M. Linguet; but he cannot surely be serious when he says, that they were enabled to conquer them because those northern countries produced no corn, and that population decreased since the introduction of grain. I shall make three observations on this passage: First, The armies of Gustavus Adolphus, Charles XII. and the king of Prussia, whose food was bread, would be as formidable against the Italians of those times, who eat less than was eaten in the days of Scipio, as their ancestors were 1400 years ago against the Romans: and M. Linguet must certainly know, that those Greeks who subsisted on bread, those Romans who eat nothing but bread and vegetables in pottage, subdued all the known world, among whom were many nations who ate less bread than themselves. A Roman soldier's allowance of bread was much greater than what soldiers have at present; and by the use of this food they had much more strength than our modern soldiers can boast of. The allowance to a Roman soldier was 64 pounds of wheat *per* month; and this he was strictly forbidden either to sell or exchange. Their soldiers had very seldom any cheese, bacon, or pulse; so that wheat was almost their only food, and the proportion was double what is allowed soldiers in our days. They ate it in bread, in flour-milk, and in thin cakes; and they were not subject to epidemic or putrid disorders, which is too much the case with our modern armies. We may easily judge, from the weight of their accoutrements, that the Roman soldiers were not possessed of less personal strength than those who compose the armies at this day; they were not less brave, nor did their food render them in any way unhealthy: on the contrary, where there is such difficulty in procuring a supply of good animal food to an army, as is often the case in modern times, it is probable that reducing them to the simple diet of a Roman soldier would be the most proper method of preventing epidemic diseases among them. Secondly, It is very doubtful whether those countries were more populous formerly than they are at this time; it is even probable that they were less so. Lastly, The people of these northern countries were not without wheat; it was the basis of their food and drink: without quoting other authors who attest it, suffice it to say, that Tacitus affirms it," &c.

In this last particular, however, our author appears to be mistaken; but whatever may be in this, we apprehend that few of our readers will entertain any doubt concerning the wholesomeness of wheat, or the propriety of making it into bread after once it is cultivated.

After wheat, oats have in our country been considered as of very great importance. It is a hardy and beautiful plant; grows with little cultivation, and is particularly well suited for lands newly brought in from a state of nature, upon which it was always used as the first crop, till the introduction of the turnip husbandry.

P p

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Oat: a valuable grain.

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bandry. The meal of it is usually very coarsely grinded, and mixed with a considerable quantity of the inner covering of the grain. Hence it has always a considerable degree of roughness, and is harsh, and unfitted to very delicate constitutions; but this very harshness, from its stimulant effect, producing a feeling of warmth in the stomach, renders it more grateful to persons much exposed to the open air, and accustomed to hard labour, who account it a hearty kind of food. Essentially, and in its intrinsic qualities, this grain differs little from some others.

21 Barley valuable from its easy conversion to a saccharine substance.

Barley is chiefly valued in consequence of the facility with which it produces a great quantity of saccharine matter by the process of vegetation or malting, which fits it for the preparation of vinous or spirituous liquors. Pease are also sometimes used when grinded into meal as an article of human food; but on account of their viscid and indigestible quality, they can never become valuable in that point of view, unless to persons engaged in the open air, in the most active and severe kinds of labour.

22 Different kinds of grain are not essentially different.

In other respects, however, it does not appear that there is much difference in point of quality or wholesomeness between the various kinds of grain cultivated in different countries. They are all capable of affording nourishment to the human constitution, and of preserving it in health and vigour: When grinded into meal, they require little farther preparation, and are easily made into bread, or otherwise prepared for immediate consumption, by being mixed according to the fancy or taste of different nations, with a small quantity of water, or any other liquid.

23 Roots used as human food.

Of the roots which are used to afford subsistence to man, the potato has hitherto been the principal. The rest, consisting chiefly of carrots, turnips, and parsnips, are never used as a sole nutriment, being rather adopted for the purpose of giving variety and relish to other food, and chiefly to butchers meat. The potato, however, is in some measure an exception to this general rule. It contains a large quantity of starch, which does not seem inferior to the starch prepared from wheat, so far at least as that ingredient is to be regarded as contributing to the nourishing qualities of the grain. Its taste resembles, more nearly than any other root, the taste of bread; and accordingly it is daily beginning to be more extensively used, and to form a larger portion of the food of the poor. The celebrated Dr Adam Smith long since remarked its tendency to produce a strong and handsome race of people, as demonstrated by its effect upon the common people of Ireland, who have for a considerable length of time in a great measure subsisted upon it.

24 They produce more food on the same extent of soil than grain.

It is to be observed concerning all the roots now mentioned, that a crop of them always contains a much larger quantity of human food than a crop of any kind of grain upon the same extent of ground. A Scots acre of good land, which will not produce more than 1280 pounds weight of oatmeal, will easily produce 20,000 pounds weight of potatoes, and will sometimes in favourable seasons produce 30,000 or 35,000 pounds weight of that valuable root. Supposing one pound of oatmeal to contain as much nourishment as four pounds of potatoes, still it is evident, that, where an extent of territory employed in the production of oats can only support one million of people, the same terri-

tory employed in the cultivation of potatoes will support fifteen millions of persons.

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Potatoes, however, and all the other roots, have hitherto possessed these radical defects: The carriage of them is extremely expensive, in consequence of their weight, arising from the vast quantity of moisture they contain. Hence they can only be cultivated in abundance in the vicinity of great towns, or where they are meant to be consumed upon the farm as the food of cattle.

25 Their defect as food. 26 The transportation of them expensive.

Roots are also incapable of long preservation. In the winter they are destroyed by frost, and in summer by heat, which causes them to vegetate or to corrupt; both of which changes render them unfit to be used as food.

27 Are unfit for long preservation.

These roots are also much more bulky than grain in proportion to the quantity of nourishment contained in them. Hence they are rendered less fit to be consumed by persons engaged in sedentary professions. Such persons accordingly seldom fail to find them injurious to the stomach, by their bulkiness, and their tendency to injure the powers of digestion, by producing flatulencies and other unpleasant consequences.

28 Too bulky for the stomach.

On the whole, the difference between these succulent roots and the grain of corn plants seems to amount to this, that, although they are both formed of similar substances, the potato being analogous to wheat, and the carrot and parsnip to rye, or rather to barley, after it has been converted into malt, yet, as the roots are formed in the bosom of the soil, and are of a loose and watery texture, their formation requires from nature a slighter effort than the bringing to perfection the small grains which are produced in the air at the top of corn plants. She therefore compensates by an abundant crop the diminished quality of her work.

29 Wherein they differ from grain.

Hence it has appeared an important problem in economics, to devise a plan by which the succulent roots of vegetables may be deprived of their superfluous moisture, that thus human art may perform for them what nature has not accomplished; and that they may be rendered completely equal in value to grain in point of quality, while in quantity they are so superior. With this view different processes have been adopted.

30 How they may be rendered equal in value to grain.

Potatoes have been grated down in their raw state, and repeatedly washed with water: the result of which operation is, that the starch contained in them is obtained with great labour; but the rest of the root is lost; and this operation cannot be applied to other kinds of roots with success. Another mode of accomplishing the object was devised a few years ago by M. Grenet, and published in the Journal of the Lycæum of Arts of Paris. It is performed in this manner: The potatoes must first be boiled by the heat of the steam of boiling water, without touching the water itself. They are then stript of their skin, and allowed to cool, and made use of in the following way:—A white iron tube of two inches diameter, and eight inches in length, open at the one end and close at the other, is everywhere perforated with small holes, and a round piece of wood is prepared, which easily goes into the tube, but which at the same time fills it. Things being thus in readiness, a quantity of the potatoes, boiled as already mentioned, is put into the tube till it is full. They are then forcibly rammed down with the round piece of wood or piston; the consequence of which operation

31 Potato-starch.

32 Grenet's mode of granulating Potatoes.

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operation is, that they are forced through the little holes in the sides of the tube, and come out in the shape of worms. They are received upon linen cloths, covered with unglazed paper, and dried in the heat of the sun, or in a warm room. The small pieces must be stirred from time to time; and it is said, that in less than 12 hours, the preparation dries so as to be capable of being preserved.

The defect of this process evidently is, that it is a petty operation, which can only proceed slowly, and upon a diminutive scale. It is therefore unlikely to be adopted in the great operations of an extensive agriculture, as a mode of preparing or preserving human food.

33
Mr For-
syth's pro-
cess for
converting
roots into
flour.

At the beginning of the present year 1802, another process for accomplishing this important object was contrived by Robert Forlyth, Esq. advocate. Of this process, which has been communicated to the Board of Agriculture, we are authorized to give the following account:

The whole difficulty of discovering a process, with the view to render succulent roots as easily preserved and transported, and therefore in every respect as valuable as grain, seems to arise from our not having the command of such a degree of steady and vigorous, but moderate heat, as will deprive them of their moisture, while at the same time they are prevented from being burnt or scorched in the way that coffee-beans are treated before being grinded. This requisite degree of heat may be obtained in a very cheap and easy manner, by making use of the steam of boiling water, which never can burn any vegetable substance. Upon this principle, Mr Forlyth's process is founded, and is conducted in the following manner:

1st, Let a quantity of potatoes, or carrots, or parsnips, &c. be washed, and then cut or chopped into very small pieces.

2dly, Lay them upon a metallic plate, and dry them with the heat of steam transmitted through the metal. They are then in a state analogous to grain, and seem capable of being preserved for any length of time.

3dly, Reduce them into flour or meal, by grinding in any mill, or with any instrument capable of grinding grain.

The meal or flour thus prepared has no tendency to attract moisture from the atmosphere, and may be preserved during any length of time, if closely pressed or packed. Without this precaution, Mr Forlyth has preserved it for six months, when it had been coarsely grinded in a coffee mill.

The drying process is not tedious. As potatoes contain a great quantity of starch or gummy matter, the pieces of them, while drying, are apt to adhere to each other; they must therefore be frequently turned or stirred during that part of the operation. When dry, they are almost as hard as barley, and taste somewhat like the skin of a roasted potato.

Carrots and parsnips contain less gummy matter. They require less attention while drying, and do not become so hard. They may be grinded with ease. Their flour is very sweet to the taste. Its smell is fragrant, and though the taste of the roots cannot be said to be altered, it is rendered rich and agreeable by the concentration produced by the process. This is more particularly the case with regard to the par-

nips. Their meal, when coarsely grinded, and exposed to the air for a month or two, loses its grateful smell, but the taste continues unchanged. The taste is communicated very rapidly to lukewarm water, by pouring it upon the meal, so that it may probably prove of some value when subjected to the vinous fermentation; and it seems not improbable, that if sugar is ever to be produced in abundance from plants of European growth, it must be by preparing them according to this process.

Mr Forlyth performed his experiments with a steam apparatus, which, with some alterations, may prove not unsuitable, when erected upon a great scale.

A, Plate XII, A shallow vessel, of white iron, 1 foot square, and 2 inches in depth, for containing substances to be dried. ³⁴ Mr For-
syth's steam
apparatus.

B, a small round vessel, in which water is kept boiling by a lamp, C, with three wicks.

D, a tube, by which the steam passes into E, which contains the drying vessel A, and is closely soldered all round to the bottom of it.

F, a tube, by which the water formed by the condensed steam, flows from the steam vessel, E, back into the boiler B, entering at the bottom of the boiler.

G, a crooked tube, by which the superfluous steam escapes into the open air. It is crooked, that it may retard the passage of the steam when the vessel is at work, which forces it to deposit more of its heat on the bottom of the drying vessel A.

H, a tube by which the boiler B is filled with hot water.

I, a tube passing up through the centre of the boiler, and serving as a chimney to the lamp C. It does not communicate with the water in the boiler.

K shows the figure of the cover of the drying vessel A. The cover has a groove or gutter LL, passing round its lower edge. The vapour which rises from the roots when drying, condenses on touching the cover, and flows down to the gutter, from which it escapes in the state of water, by a hole left for that purpose at each corner. The cover is only used for the neatness requisite in making experiments.

The whole is supported by four moveable feet, attached to the corners of the drying vessel A, but not appearing in the figure. Every part of it is made of white iron or tinned plate.

Instead of the lamp C, a small iron pan filled with pieces of burning charcoal, was sometimes used to keep the water boiling, and a still more convenient plan was at times adopted during the winter season. It consisted of resting the bottom of the boiler B, upon the front of the grate of the chamber, while a fire was burning, the rest of the instrument being at the same time supported by a rope attached to the back of a chair, to a nail or peg in the wall for hanging a picture, or to any other convenient support. When used in this last manner, however, the instrument has this defect, that the water in the tube H boils over at times into the fire, which might be avoided, by placing the tube on the opposite side of the boiler.

Upon the above contrivance it may be remarked, that a kiln formed of a large metallic plate, heated by the steam of boiling water, may prove valuable in many processes. In particular, it will probably be

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found useful for drying mait, with a view to prevent the ale formed of it from having a brown colour. It may also, perhaps, be used with success for drying wheat that is intended to be sown, to prevent the future crop from suffering by mildew, as will be afterwards mentioned; and it affords a ready and cheap mode of drying not only roots, but all vegetable productions, without burning them, or altering their taste or other essential properties.

SECT. II. *Of the most proper kinds of Vegetables to be raised for the purposes of feeding Cattle.*

THOUGH this must be an article of the utmost consequence to every farmer, we do not find that it has been much considered. Mr Anderson seems to have been the first writer on agriculture who hath properly attended to this subject; and what he hath wrote upon it, is rather a catalogue of desiderata, than any thing else: and indeed the desiderata on this subject are so many and so great, that we must acknowledge ourselves very unable to fill them up.—To attain to a competent knowledge in this respect, the following things must be taken into consideration. (1.) The wholesomeness of the food for cattle, with regard to health and strength, or fatness. (2.) The quantity that any extent of ground is capable of yielding. (3.) The quantity necessary to feed the different kinds of cattle. (4.) The labour of cultivation; and, (5.) The soil they require to bring them to perfection, and the effect they have upon it.

With regard to the wholesomeness, it is plain, that as the natural food of wild cattle is the green succulent plants they meet with all the year round, food of this kind, could it be had, must be preferable to hay; and accordingly we find that cattle will always prefer succulent vegetables where they can get them. To find plants of this kind, and having proper qualities in other respects, we must search among those which continue green all the year round, or come to their greatest perfection in the winter time.—Of these, cabbages bid fair for holding the first place; both as being very succulent, and a very large quantity of them growing upon a small space of ground. In Mr Young's Six Months Tour, we have an account of the produce of cabbages in many different places, and on a variety of soils. The produce by Mr Crow at Keolin, on a clay soil, was, on an average of six years, 35 tons per acre; by Mr Smelt at the Leases, on a sandy gravel, 18 tons per acre; by Mr Scroop at Danby, on an average of six years, 37 tons per acre: and the general average of all the accounts given by Mr Young, is 36 tons per acre.

Cabbages, however, have the great inconveniency of sometimes imparting a disagreeable flavour to the milk of cows fed with them, and even to the flesh of other cattle. This, it is said, may be prevented by carefully picking off the decayed and withered leaves: and very probably this is the case; for no vegetable inclines more to putrefaction than this; and therefore particular care ought to be taken to pull off all the leaves that have any symptoms of decay. Dr Priestley found that air was rendered noxious by a cabbage leaf remaining in it for one night, though the leaf did not show any symptom of putrefaction.—For milk cows,

probably, the cabbages might be rendered more proper food by boiling them.

The culture of the turnip-rooted cabbage has lately been much practised, and greatly recommended, particularly for the purpose of a late spring feed; and seems indeed to be a most important article in the farming bage. economy, as will be shown in its proper place.

Turnips likewise produce very bulky crops, though far inferior to those of cabbages. According to Mr Young's calculations, the finest soil does not produce above five tons of turnips per acre; which is indeed a very great disproportion: but possibly such a quantity of turnips may not be consumed by cattle as of cabbages; an ox, of 80 stone weight, ate 210 lb. of cabbages in 24 hours, besides seven pounds of hay.

Carrots are found to be an excellent food for cattle of all kinds, and are greatly relished by them. In a rich sand, according to Mr Young's account, the produce of this root was 200 bushels per acre. In a finer soil, it was 640 bushels per acre. A lean hog was fattened by carrots in ten days time: he ate 196 lb.; and his fat was very fine, white, firm, and did not boil away in the dressing. They were preferred to turnips by the cattle; which having tasted the carrots, soon became so fond of them, as difficultly to be made to eat the turnips at all. It is probable, indeed, that carrots will make a more wholesome food for cattle than either cabbages or turnips, as they are strongly antiseptic; inasmuch as to be used in poultices for correcting the sanies of cancers. It is probably owing to this, that the milk of cows fed on carrots is never found to have any bad taste. Six horses kept on them through the winter without oats, performed their work as usual, and looked equally well. This may be looked upon as a proof of their salubrity as a food; and it certainly can be no detriment to a farmer to be so much versant in medical matters, as to know the impropriety of giving putrescent food to his cattle. It is well known what a prodigious difference there is in the health of the human species when fed on putrid meats, in comparison of what they enjoy when supplied with food of a contrary nature; and why may there not be a difference in the health of beasts, as well as of men, when in similar circumstances?—It is also very probable, that as carrots are more solid than cabbages or turnips, they will go much farther in feeding cattle than either of them. The above-mentioned example of the hog seems some kind of confirmation of this: he being fed, for ten days together, with 21 lb. less weight of carrots, than what an ox devoured of cabbages and hay in one day. There is a great disproportion, it must be owned, between the bulk of an ox and that of a hog; but we can scarce think that an ox will eat as much at a time as ten hogs. At Parlington in Yorkshire, 20 work horses, four bullocks, and six milk cows, were fed on the carrots that grew on three acres; from the end of September till the beginning of May; and the animals never tasted any other food but a little hay. The milk was excellent, and 30 hogs were fattened upon what was left by the cattle.

Potatoes likewise appear to be a very palatable food for all kinds of cattle; and not only oxen, hogs, &c. are easily fed by them, but even poultry. The cheapness of potatoes compared with other kinds of food for cattle, cannot well be known, as, besides the advantage

35
Qualities of the food requisite for cattle.

36
Cabbages, their properties.

37
Air rendered noxious by them.

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38
Turnip-rooted cabbage.

39
Turnips.

40
Carrots.

41
Potatoes.

Theory.

Food for Cattle. of the crop, they improve the ground more than any other known vegetable. According to a correspondent of the Bath Society *, "roasting pork is never so moist and delicate as when fed with potatoes, and killed from the barn doors without any confinement. For bacon and hams, two bushels of pea-meal should be well incorporated with four bushels of boiled potatoes, which quantity will fat a hog of twelve stone, (fourteen pounds to the stone). Cows are particularly fond of them: half a bushel at night, and the same proportion in the morning, with a small quantity of hay, is sufficient to keep three cows in full milk; they will yield as much and as sweet butter as the best grass. In fattening cattle, I allow them all they will eat: a beast of about 35 stone will require a bushel per day, but will fatten one-third sooner than on turnips. The potatoes should be clean washed, and not given until they are dry. They do not require boiling for any purpose but fattening hogs for bacon, or poultry; the latter eat them greedily. I prefer the champion potato to any sort I ever cultivated. They do not answer so well for horses and colts as I expected (at least they have not with me), though some other gentlemen have approved of them as substitutes for oats."

* Letters and Papers on Agriculture, &c. vol. iii. art. 16.

The above-mentioned vegetables have all of them the property of meliorating, rather than exhausting the soil; and this is certainly a very valuable qualification: but carrots and cabbages will not thrive except in soils that are already well cultivated; while potatoes and turnips may be used as the first crops of a soil with great advantage. In this respect, they are greatly superior to the others; as it may be disagreeable to take up the best grounds of a farm with plants designed only for food to cattle.

42
Buck-wheat.

Buck-wheat (*Polygonum fagopyrum*) has been lately recommended as an useful article in the present as well as other respects. It has been chiefly applied to the feeding of hogs, and esteemed equal in value to barley; it is much more easily ground than barley, as a malt-mill will grind it completely. Horses are very fond of the grain; poultry of all sorts are speedily fattened by it; and the blossom of the plant affords food for bees at a very opportune season of the year, when the meadows and trees are mostly stripped of their flowers. Probably the grain may hereafter be even found a material article in distillation, should a sufficient quantity be raised with that view. From the success of some experiments detailed in the Bath Society Papers, and for which a premium was bestowed, it has been inferred, that this article ought in numerous cases to supersede the practice of summer-fallowing.

43
Whins an excellent food for horses.

Whins have lately been recommended as a very proper food for cattle, especially horses; and are recommended by Mr Anderson in a particular manner. They have this advantage that they require no culture, and grow on the very worst soil; but they are troublesome to cut, and require to be bruised in a mill constructed for this purpose; neither is the ground at all meliorated by letting whins grow upon it for any length of time. Notwithstanding these disadvantages, however, as whins continue green all the year round, and when bruised will afford an excellent succulent food, which seems possessed of strongly invigorating qualities, they may be looked upon as the cheapest winter food that can possibly be given to cattle.—According to the cal-

culations of Mr Eddison of Gateford, a single acre, well cropped with whins, will winter six horses: at three or four years growth, the whole crop should be taken, cut close to the ground, and carried to the mill; in which the whins are to be bruised, and then given to the horses. Four acres ought to be planted, that one may be used each year, at the proper age to be cut; and he reckons the labour of one man sufficient for providing food to this number of horses. He says they all prefer the whins to hay, or even to corn.

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The herb called *burnet* hath likewise been recommended as proper food for cattle, on account of its being an evergreen; and further recommended, by growing almost as fast in winter as in summer. Of this herb, however, we have very various accounts. In a letter addressed by Sir James Caldwell, F. R. S. to the Dublin Society, the culture of this plant is strongly recommended on the authority of one Bartholomew Rocque, farmer at Walham-Green, a village about three miles south-west of London.

44

What gave occasion to the recommendation of this plant, was, that about the year 1760, Mr Wych, chairman of the committee of Agriculture of the London Society for the encouragement of arts, manufactures, and commerce, came to Rocque (who was become very eminent by the premiums he had received from the society), and told him, he had been thinking, that as there are many animals which subsist wholly upon the fruits of the earth, there must certainly be some plant or herb fit for them that naturally vegetates in winter; otherwise we must believe the Creator, infinitely wise and good, to have made creatures without providing for their subsistence; and that if there had been no such plants or herbs, many species of animals would have perished before we took them out of the hands of nature, and provided for them dry meat at a season, when, indigenous plants having been indiscriminately excluded, under the name of weeds, from cultivated fields and places set apart for natural grass, green or fresh meat was no longer to be found.

45
Recommended by Sir James Caldwell.

Rocque allowed the force of this reasoning; but said, the knowledge of a grass, or artificial pasture, that would vegetate in winter, and produce green fodder for cattle, was lost; at least, that he knew of no such plant.—Mr Wych, however, knowing how very great the advantage would be of discovering a green fodder for winter and early in the spring, wrote to Bern, and also to some considerable places in Sweden, stating the same argument, and asking the same question. His answers to these letters were the same that had been given by Rocque. They owned there must be such plant, but declared they did not know it.

Mr Wych then applied again to Rocque; and desired him to search for the plant so much desired, and so certainly existing. Rocque set about this search with great assiduity; and finding that a pimpernel, called *burnet*, was of very speedy growth, and grew nearly as fast in winter as in summer, he took a handful of it and carried it into his stable, where there were five horses; every one of which ate of it with the greatest eagerness, snatching it even without first smelling it. Upon the success of this experiment he went to London, and bought all the burnet seed he could get, amounting to no more than eight pounds, it having been only used in salads; and he paid for it at the rate of

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of 4s. a pound. Six of the eight pounds of seed he sowed upon half an acre of ground, in March, in the year 1761, with a quarter of a peck of spring wheat, both by hand. The seed being very bad, it came up but thin. However, he sowed the other two pounds in the beginning of June, upon about six rood of ground: this he mowed in the beginning of August; and at Michaelmas he planted off the plants on about 20 rood of ground, giving each plant a foot every way, and taking care not to bury the heart. These plants bore two crops of seed the year following; the first about the middle of June, the second about the middle of September; but the June crop was the best. The year after, it grew very rank and produced two crops of seed, both very good. As it ought not to be cut after September, he let it stand till the next year; when it sheltered itself, and grew very well during all the winter, except when there was a hard frost; and even during the frost it continued green, though it was not perceived to grow. In the March following it covered the ground very well, and was fit to receive cattle.

If the winter is not remarkably severe, the burnet, though cut in September, will be 18 inches long in March; and it may be fed from the beginning of February till May: if the cattle are taken off in May, there will be a good crop of seed in the beginning of July. Five weeks after the cattle are taken off, it may be removed, if that is preferred to its standing for seed. It grows at the rate of an inch a-day, and is made into hay like other grass. It may be mown three times in one summer, and should be cut just before it begins to flower. Six rood of ground has produced 1150 pounds at the first cutting of the third year after it was sowed; and, in autumn 1763, Rocque sold no less than 300 bushels of the seed.

According to Rocque, the soil in which burnet flourishes best, is a dry gravel; the longest drought never hurts it: and Sir James Caldwell asserts, that he saw a very vigorous and exuberant plant of this kind, growing from between two bricks in a wall in Rocque's ground, without any communication with the soil; for he had cut away all the fibres of the root that had stretched downward, and penetrated the earth, long before.

Burnet was found equally fit for feeding cows, sheep, and horses; but the sheep must not be suffered to crop it too close. Though no seed was left among the hay, yet it proved nourishing food; and Rocque kept a horse upon nothing else, who, at the time of writing the account, was in good heart, and looked well. He affirmed also, that it cured horses of the distemper called the *grease*, and that by its means he cured one which was thought incurable; but says, it is only the first crop which has this effect.

46
Burnet recommended an improper food by Mr Miller and Mr Anderson.

This is the substance of Sir James Caldwell's letter to the Dublin Society, at least as to what regards the culture of burnet; and it might reasonably be expected, that a plant, whose use was recommended to the public with so much parade, would soon have come into universal esteem. We were surprised, therefore, on looking into Mr Miller's Dictionary, to find the following words, under the article *Poterium*:—"This plant has of late been recommended by persons of little skill, to be sown as a winter pabulum for cattle: but whoever will give themselves the trouble to examine

the grounds where it naturally grows will find the plants left uneaten by the cattle, when the grass about them has been cropped to the roots; besides, in wet winters, and in strong land, the plants are of short duration, and therefore very unfit for that purpose; nor is the produce sufficient to tempt any person of skill to engage in its culture; therefore I wish those persons to make trial of it in small quantities, before they embark largely in these new schemes."—Mr Anderson, too, in his Essays on Agriculture, mentions the produce of burnet being so small, as not to be worth cultivating.

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Upon the authority of Mr Rocque, likewise, the ⁴⁷white beet is recommended as a most excellent food recommended for cows; that it vegetates during the whole winter, consequently is very forward in the spring; and that the most profitable way of feeding cows is to mow this herb, and give it to them green all the summer. It grew in Rocque's garden, during a very great drought, no less than four feet high, from the 30th of May to the 3d of July; which is no more than one month and four days. In summer it grows more than an inch a-day; and is best sown in March: a bushel is enough for an acre, and will not cost more than ten shillings. It thrives best in a rich, deep, light soil: the stalks are very thick and succulent; the cows should therefore eat them green.

Another species of beet (*Beta cicla*), the Mangel ⁴⁸Root of Wurzel, or *Root of Scarcity*, as it has been called, has Scarcity. been lately extolled as food both for man and cattle; but, after all, seems only to deserve attention in the latter view. It is a biennial plant; the root is large and fleshy, sometimes a foot in diameter. It rises above the ground several inches, is thickest at the top, tapering gradually downward. The roots are of various colours, white, yellow, and red; but these last are always of a much paler colour than beetrave. It is good fodder for cows, and does not communicate any taste to the milk. It produces great abundance of leaves in summer, which may be cut three or four times without injuring the plant. The leaves are more palatable to cattle than most other garden plants, and are found to be very wholesome. The farmers in those parts of Germany where it is chiefly cultivated, we are told, prefer this species of beet, for feeding cattle, to cabbages, principally because they are not so liable to be hurt by worms or insects; but they think they are not so nourishing as turnips, potatoes, or carrots, and that cattle are not nearly so soon fattened by this root as by carrots, parsnips, or cabbages. It has even been asserted, that this root affords less nourishment than any of those that have been commonly employed for feeding cattle. This does not correspond with the pompous accounts with which the public has been entertained. Upon the whole, however, it is a plant which seems to deserve the attention of our farmers; as on some soils, and in particular circumstances, it may prove a very useful article for the above purposes.

In Mr Anderson's Essays, we find it recommended to ⁴⁹Sheep's fescue make trial of some kinds of grasses, which probably fescue grass. would not only answer for fresh fodder during the winter, but might also be cut for hay in summer. This is particularly the case with that species called *sheep's fescue grass*. "I had, says he, a small patch of this grass in winter 1773; which, having been cut in the month

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month of August or September preceding, was saved from that period, and had advanced before winter to the length of five or six inches; forming the closest pile that could be imagined. And although we had about six weeks of very intense frost, with snow; and about other six weeks, immediately succeeding that, of exceeding keen frost every night, with frequent thaws in the day time, without any snow, during which time almost every green thing was destroyed; yet this little patch continued all along to retain as fine a verdure as any meadow in the month of May; hardly a point of a leaf having been withered by the uncommon severity of the weather. And as this grass begins to vegetate very early in the spring, I leave the reader to judge what might be the value of a field of grass of this kind in these circumstances."

50
Purple fescue.

Of another kind of grass, called *purple fescue*, Mr Anderson gives the following character: "It retained its verdure much better than rye-grass during the winter season; but it had more of its points killed by the weather than the former. It likewise rises in the spring, at least as early as rye-grass."

This ingenious farmer has also made experiments on the culture of these and several other kinds of grasses; which being very well worthy of attention, we shall here insert.

1. *Purple fescue grass*. "Although this grass is very often found in old pastures, yet, as it has but few flower-stalks, and as it is greedily eaten by all domestic animals, these are seldom suffered to appear; so that it usually remains there unperceived. But it seems to be better able to endure the peculiar acrimony of the dung of dogs than almost any other plant; and is therefore often to be met with in *dog hills*, as I call the little hills by road sides where dogs usually piss and dung: and as it is allowed to grow there undisturbed, the farmer may have an opportunity of examining the plant, and becoming acquainted with its appearance.

"The leaves are long and small, and appear to be roundish, something like a wire; but, upon examination, they are found not to be tubulated like a reed or rush; the sides of the leaf being only folded together from the middle rib, exactly like the strong bent-grass on the sea shore. The flower-stalk is small, and branches out in the head, a little resembling the wild oat; only the grains are much smaller, and the ear does not spread full open, but lies bending a little to one side. The stalks are often spotted with reddish freckles, and the tops of the roots are usually tinged with the same colour; from whence it has probably obtained its distinctive name of *fescuca rubra*, or *red (purple) fescue*.

"It is often to be met with in old garden walks; and, as its leaves advance very quickly after cutting, it may usually be discovered above the other grasses, about a week or fortnight after the walks are cut. Nor do they seem to advance only at one season, and then stop and decay, like the rye-grass; but continue to advance during the whole of the summer, even where they are not cut; so that they sometimes attain a very great length. Last season (1774), I measured a leaf of this grass, that sprung up in a neglected corner, which was four feet and four inches in length, although not thicker than a small wire. It is unneces-

sary to add, that these leaves naturally trail upon the ground, unless where they meet with some accidental support; and, that if any quantity of it is suffered to grow for a whole season, without being eaten down or cut, the roots of the leaves are almost rotted, by the overshadowing of the tops of the other leaves, before the end of the season.

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"This is the appearance and condition of the plant in its native situation: as it is seldom that it is discovered but in pretty old pastures, and as in that state it carries only a very few seed-stalks, it was with some difficulty that I could collect a small handful of the seed, which I carefully sowed in a small patch of garden mould, to try if it could be easily cultivated. It came up as quickly as any other kind of grass, but was at first as small as hairs: the leaves, however, advanced apace; and were, before autumn, when the grain with which they had been sowed was cut down, about 16 or 18 inches in length; but having been sown very thin, it was necessary to pick out some other kinds of grass that came up amongst it, lest it might have been choked by them. Early next spring it advanced with prodigious vigour, and the tufts that were formed from every seed became exceeding large; so that it quickly filled the whole ground. But now the leaves were almost as broad as those of common rye-grass, and the two sides only inclined a little towards one another from the mid-rib, without any appearance of roundness. In due time a great many seed-stalks sprung out, which attained very nearly to the height of four feet, and produced seeds in abundance; which may be as easily sowed as those of common rye-grass.

51
Appearance in its
cultivated
state.

"The prodigious difference between this plant in its native and cultivated state amazed me; but it was with a good deal of satisfaction that I found there would be no difficulty in procuring seeds from it, which I had much doubted of at first. It would seem, that nature hath endowed this plant with a strong generative power during its youth, which it gradually loses as it advances in age (for the difference perceived in this case could not be attributed to the richness of the soil); and that, on the contrary, when it was old, the leaves advanced with an additional vigour, in proportion to the declining strength of the flower-stalks: for the leaves of the young plants seldom exceed two feet, whereas numbers of the old leaves were near four feet in length.

"From these peculiarities in the growth of this plant, it would seem to promise to be of great use to the farmer; as he could reap from a field of it, for the first two or three years, as great a weight of hay as he could obtain from any of the culmiferous grasses (those bearing a long jointed stalk); and, if he meant afterwards to pasture it, he would suffer no inconveniences from the flower-stalks; and the succulent leaves that continue to vegetate during the whole summer, would at all times furnish his cattle with abundance of wholesome food. It has also been remarked, that this grass rises as early in the spring as rye-grass; and continues green for the greatest part of winter, which the other does not. It is moreover an abiding plant, as it seems never to wear out of the ground where it has once been established. On all which accounts, it appears to me highly to merit the attention of the farmer; and well

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well deserves to have its several qualities, and the culture that best agrees with it, ascertained by accurate experiments.

52
Sheep's fescue described.

2. "*Sheep's fescue grass*, or *festuca ovina*, is much praised by the Swedish naturalists for its singular value as a pasture-grass for sheep; this animal being represented as fonder of it than of any other grass, and fattening upon it more quickly than on any other kind of food whatever. And indeed, the general appearance of the plant, and its peculiar manner of growth, seems very much to favour the accounts that have been given us of it.

"This plant is of the same family with the former, and agrees with it in several respects; although they may be easily distinguished from one another. Its leaves, like the former, in its natural state, are always rounded, but much smaller; being little bigger than large horse hairs, or swine-bristles, and seldom exceed six or seven inches in length. But these spring out of the root in tufts, so close upon one another, that they resemble, in this respect, a close hair brush more than any thing else I know: so that it would seem naturally adapted to form that thick short pile of grass in which sheep are known chiefly to delight. Its flower-stalks are numerous, and sometimes attain the height of two feet; but are more usually about 12 or 15 inches high.

53
Its appearance when cultivated.

"Upon gathering the seeds of this plant, and sowing them as the former, it was found that they sprung up as quickly as any other kind of grass; but the leaves are at first no bigger than a human hair. From each side springs up one or two of these hair-like filaments, that in a short time send out new offsets, so as quickly to form a sort of tuft, which grows larger and larger, till it at length attains a very large size, or till all the intervals are closed up, and then it forms the closest pile of grass that it is possible to imagine. In April and May it pushed forth an innumerable quantity of flower-stalks, that afforded an immense quantity of hay; it being so close throughout, that the scythe could scarcely penetrate it. This was allowed to stand till the seeds ripened; but the bottoms of the stalks were quite blanched, and almost rotted for want of air before that time.

"This was the appearance that it made the first year after it was sowed: but I have reason to think, that, after a few years, it likewise produces fewer seed-stalks, and a greater quantity of leaves, than at first. But however that may be, it is certain, that if these are eat down in the spring, it does not, like rye-grass, persist in a continued tendency to run to seed; but is at once determined to push forth a quantity of leaves without almost any stalks at all: and as all domestic animals, but more especially sheep, are extremely fond of this grass, if they have liberty to pasture where it grows, they bite it so close as never to suffer almost a single seed-stalk to escape them; so that the botanist will often search in vain for it, when he is treading upon it with his feet. The best way to discover it in any pasture, is to search for it in winter, when the tufts of it may be easily distinguished from every other kind of grass, by their extraordinary closeness, and the deep green colour of the leaves.

54
What soil most proper.

"It seems to grow in almost any soil; altho' it is imagined that it would flourish best in a light sandy soil, as

it can evidently live with less moisture than almost any other kind of grass; being often seen to remain in the sods that have been employed in coping for stone dykes, after all the other grasses that grew in them have disappeared. It is likewise found in poor barren soils, where hardly any other plant can be made to grow at all; and on the surface of dry worn-out peat moirs, where no moisture remains sufficient to support any other plant whatever: but in neither of these situations does it thrive; as it is there only a weak and unsightly plant, very unlike what it is when it has the good fortune to be established upon a good soil; although it is seldomer met with in this last state than in the former.

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"I will not here repeat what has been already said about the particular property that this plant possesses of continuing all winter; nor point out the benefits that the farmer may reap from this valuable quality.—He need not, however, expect to find any verdure in winter on such plants as grow upon the loose mossy soil above-mentioned; for, as the frost in winter always hoves up the surface of this soil, the roots of the plants are so lacerated thereby, as to make it, for some time in the spring, to all appearance dead. Nor will he often perceive much verdure in winter upon those plants that grow upon poor hungry soils, which cannot afford abundant nourishment to keep them in a proper state of vegetation at all times: but such plants as grow on earthen dykes, which usually begin to vegetate with vigour when the autumnal rains come on, for the most part retain their verdure at that season almost as well as if they were in good garden-mould.

"I have been very particular in regard to this plant; because, in as far as my observations have yet gone, it promises on many accounts to make a most valuable acquisition to the farmer, and therefore justly demands a very particular share of his attention."

3. The *holcus lanatus*, or creeping soft-grass of Hud-⁵⁵ Holcus lanatus.
son.—This is considered by our author as one of the most valuable kinds of meadow-grasses; its pile being exceedingly close, soft, and succulent. It delights much in moisture, and is seldom found on dry ground, unless the soil is exceeding rich. It is often found on those patches near springs, over which the water frequently flows; and may be known by the uncommon softness and succulence of the blade, the lively light green colour of the leaves, and the matted intexture of its roots. But, notwithstanding the softness of its first leaves, when the seed-stalks advance, they are rough to the touch, so that the plant then assumes a very different appearance from what we would have expected. The ear is branched out into a great number of fine ramifications somewhat like the oat, but much smaller.—This kind of grass, however, would not be easily cultivated, on account of a kind of soft membrane that makes the seeds adhere to the stalk, and to one another, after they are separated from it, as if they were intermixed with cobweb, so that it is difficult to get them separated from the stalk, or to spread readily in sowing. It spreads, however, so fast by its running roots, that a small quantity sowed very thin, would be sufficient to stock a large field in a short time.

These are the kinds of *grasses*, properly so called, which have not as yet been cultivated, that Mr. Anderson thinks the most likely to be of value; but, besides these, he recommends the following of the pea tribe.

1. *Milk-vetch*,

Theory.

Food for Cattle.

56
Milk-
vetch.

1. *Milk-vetch*, *liquorice-vetch*, or *milkwort*. This plant, in some respects, very much resembles the common white clover: from the top of the root a great number of shoots come out in the spring, spreading along the surface of the ground every way around it; from which arise a great many clusters of bright yellow flowers, exactly resembling those of the common broom. These are succeeded by hard round pods, filled with small kidney-shaped seeds. From a supposed resemblance of a cluster of these pods to the fingers of an open hand, the plant has been sometimes called *ladies-fingers*. By others it is called *crow-toes*, from a fancied resemblance of the pods to the toes of a bird. Others, from the appearance of the blossom, and the part where the plant is found, have called it *feal*, improperly *fell-broom*. It is found plentifully almost everywhere in old grass fields; but as every species of domestic animals eat it, almost in preference to any other plant, it is seldom allowed to come to the flower in pasture grounds, unless where they have been accidentally saved from the cattle for some time; so that it is only about the borders of corn fields, or the sides of inclosures to which cattle have not access, that we have an opportunity of observing it. As it has been imagined that the cows which feed on the pastures, where this plant abounds, yield a quantity of rich milk, the plant has, from that circumstance, obtained its most proper English name of *milk-vetch*.

57
Its good
qualities.

One of the greatest recommendations of this plant is, that it grows in poor barren ground, where almost no other plant can live. It has been observed in ground so poor, that even heath, or ling (*erica communis*), would scarcely grow; and upon bare obdurate clays, where no other plant could be made to vegetate; inasmuch that the surface remained entirely uncovered, unless where a plant of this kind chanced to be established; yet, even in these unfavourable circumstances, it flourished with an uncommon degree of luxuriance, and yielded as tender and succulent, though not such abundant shoots, as if reared in the richest manured fields. In dry barren sands, also, where almost no other plant could be made to live, it has been found to send out such a number of healthy shoots all round, as to cover the earth with the closest and most beautiful carpet that can be desired.

The stalks of the milk-vetch are weak and slender, so that they spread upon the surface of the ground, unless they are supported by some other vegetable. In ordinary soils they do not grow to a great length, nor produce many flowers; but in richer fields the stalks grow to a much greater length, branch out a good deal, but carry few or no flowers or seeds. From these qualities our author did not attempt at first to cultivate it with any other view than that of pasture; and, with this intention, sowed it with his ordinary hay seeds, expecting no material benefit from it till he desisted from cutting his field. In this, however, he was agreeably disappointed; the milk-vetch growing the first season as tall as his great clover, and forming exceeding fine hay; being scarce distinguishable from lucerne, but by the slenderness of the stalk, and proportional smallness of the leaf.

Another recommendation to this plant is, that it is perennial. It is several years after it is sowed before it attains to its full perfection; but, when once esta-

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lished, it probably remains for a great number of years in full vigour, and produces annually a great quantity of fodder. In autumn 1773, Mr Anderson cut the stalk from an old plant that grew on a very indifferent soil; and, after having thoroughly dried it, he found that it weighed 14 ounces and a half.

Food for Cattle.

The stalks of this plant die down entirely in winter, and do not come up in the spring till the same time that clover begins to advance; nor does it advance very fast, even in summer, when once cut down or eaten over: so that it seems much inferior to the above-mentioned grasses; but might be of use to cover the worst parts of a farm, on which no other vegetable could thrive.

2. The *common yellow vetchling* (*Lathyrus pratensis*), or *everlasting tare*, grows with great luxuriance in stiff clay soils, and continues to yield annually a great weight of fodder, of the very best quality, for any length of time. This is equally fit for pasture or hay; and grows with equal vigour in the end of summer as in the beginning of it; so would admit being pastured upon in the spring, till the middle, or even the end of May, without endangering the loss of the crop of hay. This is an advantage which no other plant except clover possesses; but clover is equally unfit for early pasture or for hay. Sainfoin is the only plant whose qualities approach to it in this respect, and the yellow vetchling will grow in such soils as are utterly unfit for producing sainfoin.—It is also a perennial plant, and increases so fast by its running roots, that a small quantity of the seed would produce a sufficient number of plants to fill a whole field in a very short time. If a small patch of good ground is sowed with the seeds of this plant in rows, about a foot distance from one another, and the intervals kept clear of weeds for that season, the roots will spread so much as to fill up the whole patch next year; when the stalks may be cut for green fodder or hay. And if that patch were dug over in the spring following, and the roots taken out, it would furnish a great quantity of plants, which might be planted at two or three feet distance from one another, where they would probably overspread the whole field in a short time.

58
Yellow
vetchling.

3. The *common blue tare* seems more likely than the former to produce a more flourishing kind of hay, as it abounds much more in seeds; but as the stalks come up more thinly from the root, and branch more above, it does not appear to be so well adapted for a pasture grass as the other. The leaves of this plant are much smaller, and more divided, than those of the other; the stalks are likewise smaller, and grow to a much greater length. Though it produces a great quantity of seeds, yet the small birds are so fond of them, that, unless the field were carefully guarded, few of them would be allowed to ripen.

59
Blue tare.

4. The *vicia sepium*, *purple everlasting*, or *bush-vetch*. Our author gives the preference to this plant beyond all others of the same tribe for pasture. The roots of it spread on every side a little below the surface of the ground, from which, in the spring, many stems arise quite close by one another; and as these have a broad tufted top covered with many leaves, it forms as close a pile as could be desired. It grows very quickly after being cut or crot, but does not arrive at any great height; so that it seems more proper for pasturage than

60
Bush-
vetch.

Q9

making

Food for
Cattle.

making hay; although, upon a good soil, it will grow sufficiently high for that purpose; but the stalks grow so close upon one another, that there is great danger of having it rotted at the root, if the season should prove damp. It seems to thrive best in a clay soil.

61
Everlasting
pea.

Besides these, there are a variety of others of the same class, which he thinks might be useful to the farmer. The common garden everlasting pea, cultivated as a flowering plant, he conjectures, would yield a prodigious weight of hay upon an acre; as it grows to the height of ten or twelve feet, having very strong stalks, that could support themselves without rotting till they attained a great height.

62
Achillea
millefo-
lium.

One other plant, hitherto unnoticed, is recommended by our author to the attention of the farmer; it is the *common yarrow* (*Achillea millefolium*), or *hundred-leaved grass*. Concerning this plant, he remarks, that in almost every fine old pasture, a great proportion of the growing vegetables with which the field is covered consists of it; but the animals which feed there are so fond of the yarrow, as never to allow one seed-stalk of it to come to perfection. Hence these seed-stalks are never found but in neglected corners, or by the sides of roads; and are so disagreeable to cattle, that they are never tasted; and thus it has been erroneously thought that the whole plant was refused by them.—The leaves of this plant have a great tendency to grow very thick upon one another, and are therefore peculiarly adapted for pasturage. It arrives at its greatest perfection in rich fields that are naturally fit for producing a large and succulent crop of grass. It grows also upon clays; and is among the first plants that strike root in any barren clay that has been lately dug from any considerable depth; so that this plant, and thistles, are usually the first that appear on the banks of deep ditches formed in a clayey soil. All animals delight to eat it; but, from the dry aromatic taste it possesses, it would seem peculiarly favourable to the constitution of sheep. It seems altogether unfit for hay.

63
Lucerne.

Besides these plants, which are natives of our own country, there are others which, though natives of a foreign climate, are found to thrive very well in Britain; and have been raised with such success by individuals, as highly to merit the attention of every farmer. Among these the first place is claimed by lucerne.

This is the plant called *medica* by the ancients, because it came originally from Media, and on the culture of which they bestowed such great care and pains. It hath a perennial root, and annual stalks, which, in a good soil, rise to three feet, or sometimes more in height; its leaves grow at a joint like those of clover; the flowers, which appear in June, are purple; and its pods are of a screw-like shape, containing seeds which ripen in September. All sorts of domestic cattle are fond of this plant, especially when allowed to eat it green, and black cattle may be fed very well with the hay made from it; but an excess of this food is said to be very dangerous.

Lucerne has the property of growing very quickly after it is cut down, inasmuch that Mr Rocque has mowed it five times in a season, and Mr Anderson affirms he has cut it no less than six times. It is, however, not very easily cultivated; in consequence of which it sometimes does not succeed.

64
Timothy
grass.

Another grass was brought from Virginia, where it

is a native, and sown by Rocque in 1763. This grass is called *timothy*, from its being brought from New-York to Carolina by one Timothy Hanson. It grows best in a wet soil; but will thrive in almost any. If it is sown in August, it will be fit for cutting in the latter end of May or beginning of June. Horses are very fond of it, and will leave lucerne to eat it. It is also preferred by black cattle and sheep; for a square piece of land having been divided into four equal parts, and one part sowed with lucerne, another with sainfoin, a third with clover, and the fourth with timothy, some horses, black cattle, and sheep, were turned into it, when the plants were all in a condition for pasturage; and the timothy was eaten quite bare, before the clover, lucerne, or sainfoin, was touched.

Food for
Cattle.

One valuable property of this grass is, that its roots are so strong and interwoven with one another, that they render the wettest and softest land, on which a horse could not find footing, firm enough to bear the heaviest cart. With the view of improving boggy lands, therefore, so as to prevent their being poached with the feet of cattle, Mr Anderson recommends the cultivation of this kind of grass, from which he has little expectation in other respects.

On this subject, of the kind of plants most proper to be raised for feeding cattle, one general question ought not to pass unnoticed concerning the propriety of feeding them upon roots and plants cultivated by the aid of the plough, or upon leaving them to derive their subsistence from lands allowed to remain continually in pasturage. The advantages of the latter practice are set forth by Thomas Davis, Esq; of Longleet, in the following words. "Experience sufficiently evinces the extreme difficulty of persuading tenants that they get more (generally speaking) by feeding their lands, than by ploughing them; yet it requires very few arguments to convince a landlord, that, in cold wet land especially, the less ploughed land you have, the less you put it in the tenant's power to ruin your estate. That a tenant of 60l. *per annum* on a dairy farm will get money, while a corn farm of the same size will starve its occupier (though perhaps the former gives 15s. *per acre* for his land, and the latter only 10s.), is self-evident. The plough is a friend of everybody's, though its advantages are very far from being particularly and locally felt; corn being an article that will bear keeping till the whim or caprice, or supposed advantage of its possessor, call it forth. But the produce of the cow is far otherwise. Cheese must necessarily be sold at a certain period: it is a ponderous article; and one-twelfth, or at least one-fifteenth of its value, is often paid for carrying it to a fair 50 miles off; and the butter and skimmed milk find their way no great distance from home, as is evident by the price of butter varying frequently one-third in 20 or 30 miles. Every inhabitant of Bath must be sensible, that butter and cheese have risen one-third or more in price within 20 years. Is not this owing to the great encouragement given to the plough and to grazing, at a time when, on account of the increased demand for milk, cream, butter, and cheese, every exertion on behalf of the dairy should have been encouraged?" &c.

In some remarks on this letter by Mr Billingsley, the same superiority of dairy farms to the arable kind is asserted in the most positive terms. "Perhaps (says he)

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Grazing
compared
with the
plough.Bath Pa-
pers, vol. iii.

Food for
Cattle.

he) there cannot be a stronger proof of the inferiority of the plough with respect to profit, than the superior punctuality of the dairy farmer in the payment of his rent. This observation, I believe, most stewards who superintend manors devoted partly to corn and partly to dairy farms, will verify; at least I have never met with one who controverts it. But perhaps the advocate for the plough will desire me not to confound the abuse of a thing with its intrinsic excellence; and say, that the generality of corn farmers are most egregious slovens; that lands devoted to the plough are not confined to such a mediocrity of profit as 20s. *per acre*; that the produce of artificial grasses (without which a well managed arable farm cannot exist), far exceeds that of natural grass both in respect of quantity and nutrition: that the straw yard is a most convenient receptacle for the cow when freed from the pail. These, and many other reasons, may be adduced to show the propriety of walking in the middle path, and of judiciously blending *arable* with *pasture*, in the proportion perhaps of *three* of the latter to *one* of the former."

On these letters we shall only remark, that for the good of mankind we hope the opinions they contain will never come into general practice; as thus the price of bread must be raised so high, that the lower classes of people would be entirely deprived of it. In the Bath Papers, vol. v. p. 43. we have a method proposed by Mr Wimpey of improving small arable farms in such a manner as to make them yield as much milk, butter, and cheese, as those which are kept continually in pasture. He agrees with the maxim already mentioned, that small arable farms do not afford the occupier so good a maintenance as dairy farms of the same value; and that the possessor of a dairy farm will do well and save money, while the former, with much toil and trouble, is starving himself and family. Notwithstanding this, he maintains, that there is an essential difference between ground that is naturally arable, and such as is by nature adapted for pasture. Land which is naturally arable, according to him, can by no means be converted into pasture of any duration. "Such as, from a wild state of nature, overrun with furze, fern, bushes and brambles, has been rendered fertile by means of the plough, must be kept in that improved state by its frequent use; otherwise it would soon revert to that wild barren state which was its original condition. A farm, therefore, which consists wholly, or almost so, of land that is properly arable, must ever continue arable; for it is not practicable to render it in any degree fertile but by means of the plough, or to keep it long in that state even when it is made so." He is of opinion, however, that by raising crops proper for feeding cattle, the possessor of an arable farm may raise as great a number of horned cattle as one who has a pasture farm; the only question is, whether he can be reimbursed of his expences by the produce? "To ascertain this fact (says he), we must inquire what may be the average expences of keeping a milch cow on a dairy farm for any given time. It is said, upon very good authority, that the expence is generally from 3l. to 3l. 10s. *per annum*. Two acres and a half of pasture fit for this use is sufficient to keep a cow the whole year through, and such land is valued at from 25s. to 30s. *per acre*.

At 25s. the keeping of each cow would amount to 3l. 2s. 6d. *per annum*. A dairy farm, therefore, consisting of 48 acres, at 25s. *per annum*, would amount to 60l. rent; and the number of cows that might be kept on such a farm would be about 20. In the next place, with regard to the expence of keeping a cow upon food raised in arable land as a succedaneum for grass, we are assured by unquestionable authority, that a bushel of potatoes, given half at night and half in the morning, with a small allowance of hay, is sufficient to keep three cows a day; by which allowance their milk will be as rich and as good as in the summer months when the cows are in pasture. An acre of land, properly cultivated with potatoes, will yield 337 bushels; and the total expence of cultivation, rent and tithe included, will not exceed 6l. 13s. If three cows eat seven bushels *per week*, then they would eat 364 bushels in a year; and 20 cows would consume 2433 bushels." So that, according to this calculation, seven acres and a quarter would nearly maintain as many cows as on the pasture farm could be maintained by 48 acres. If then the cultivation of one acre of ground costs 6l. 13s. the cultivation of seven acres and a quarter will cost about 48l. We have seen, however, that the rent of a dairy farm capable of maintaining 20 milch cows, is not less than 60l. so that the calculation is thus entirely in favour of the arable farm; seven or eight acres of the arable farm being superior by 12l. in value, when cultivated with potatoes, to 48 acres of meadow or pasture ground." "It must indeed be observed (adds our author), that in this statement no allowance is made for the small quantity of hay given to the cows with the potatoes. It must be noted also, that the account of cultivation is charged with 40s. an acre for manure, and some expence for ploughing, which of right is chargeable to the crop of wheat that is to follow. Now, if we deduct 40s. an acre from the expence of cultivating the potatoes, it reduces the sum to 4l. 13s. and the whole expence upon seven acres and a quarter is thus less than 34l. and consequently the keeping of 20 cows is little more than half to the occupier of the arable farm what it is to the occupier of the grazing farm. If this conclusion be fairly drawn, and the calculation free from errors, it is matter of the greatest importance, especially to the little arable farmer. It plainly raises him from a state of acknowledged inferiority to one greatly superior."

Our author next proceeds to obviate an objection, ⁶⁶ "that the whole of his reasoning must be indecisive, as relating only to potatoes." In opposition to this, he ^{answered from an experiment of Mr Vagg.} adduces an experiment made on a pretty large scale by Mr Vagg; from which it appears, that cabbages, when raised upon arable ground, are nearly as much superior to a natural crop as potatoes are. Twelve acres were employed in this experiment, and those of an indifferent quality. The rent was 30s. *per acre*, and the whole expence of culture and carting off the crop amounted only to 11. 14s. so that all the cost of the twelve acres was 38l. 9s. From the produce were ⁶⁷ fed 45 oxen and upwards of 60 sheep; and he was ^{Number of cattle fed from 12 acres of cabbages.} assured that they improved as fast upon it as they do in the best pasture months, May, June, and July. "Now (says Mr Wimpey), if instead of 60 sheep we reckon 15 oxen, or that four sheep are equal to about ^{one}

Profit from
different
Vegetables.

one ox, in which we cannot err much; then 60 oxen were kept well for three months, or, which is the same thing, 15 for a whole year, for 38l. 9s.; and consequently 20 oxen would cost 51l. 5s. 4d. which is not quite 3l. more than the keeping of 20 cows would cost in potatoes. Turnips, turnip-rooted cabbage, carrots, parsnips, and some other articles, by many experiments often repeated, have been found quite adequate to the same valuable purposes; at least so far as to be more lucrative than meadow or pasture. Clover and rye-grass are omitted, as having been long in general practice; but are in common very short of the advantages which may be derived from the cultivation of the other articles recommended." Sainfoin is greatly recommended: but our author acknowledges that it makes but a miserable appearance the first year, though afterwards he is of opinion that one acre of sainfoin is equal to two of middling pasture ground; for which reason he accuses the farmer of intolerable indolence who does not cultivate so useful a plant. On this subject, however, we must remember, that the culture of sainfoin is clogged with the loss of one if not two crops; which may sometimes be inconvenient, though afterwards it remains in perfection for no less than 20 years. The most advantageous method of raising it he supposes to be after potatoes. Thus it will thrive even upon very poor ground; as the culture and manure necessary for the potatoes both pulverize the soil and enrich it to a sufficient degree.

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Feeding of
cattle not
brought to
perfection.

We shall afterwards have an opportunity of attending to this subject when we come to consider the subject of feeding cattle. In the mean time, it may be remarked, that this branch of the art of the husbandman, has by no means hitherto been carried to its highest perfection in this country; and that in proportion as it is improved, and cattle are more carefully fed, the value of the plough will appear more conspicuous.

SECT. III. *Of the comparative Profit to be derived from the Cultivation of different Vegetables.*

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Circum-
stances that
render ve-
getables
profitable
or not.

LIKE every other artist or tradesman, a husbandman will always be under the necessity of regarding himself as the servant of the community, and must endeavour to rear the vegetables that are in greatest demand, and that will enable him to derive the greatest profit from the portion of territory which he occupies. The product of some soils and situations is so fixed by nature, that it is in vain for human art or industry to alter her destination. In our own and in many other countries, there are extensive tracts of lofty and rugged mountains, from which the art of agriculture seems to be for ever banished. Such situations belong exclusively to the shepherd and his flock, to the utter exclusion of the plough. Even on some arable lands it may be found fruitless to attempt to rear many of the more valuable vegetable productions. In many bleak and unsheltered fields of the higher country of Scotland, in which turnips and oats are cultivated with tolerable success, it would be in vain to expect regular crops of wheat; and though potatoes are found to prosper in a sandy, or even a mossy soil, it would be in vain to expect them to produce an equally valuable crop upon a stiff clay, in which the roots cannot swell or expand to a

proper size. In forming a plan of agriculture, therefore, the husbandman must not overlook the peculiar nature of the soil that has fallen to his lot, or its physical relation to the nature of certain vegetables, as he can only hope for success by adapting the one of these to the other.

Profit from
different
Vegetables.

The husbandman must also have a special regard to the state of the market to which his commodities are to be brought. It is in vain for him to cultivate large quantities of roots, such as potatoes or carrots, at a distance from great towns, which alone can afford a market for them, unless he intend to consume them upon his own farm by feeding cattle. In a part of the country, however, in which great breweries are established, if his soil is fit for the purpose, he may safely venture to rear large quantities of barley; as he cannot in such a situation be at any time destitute of a market. Hence we can perceive, that it is the state of the market which must at all times regulate the enterprises of the agriculturist, and the kind of crops which he is to bring forward. Thus also we see the mode in which agriculture may be most successfully encouraged by a nation. Let an abundant market be provided for the produce of the soil, and that produce will infallibly be augmented. In this way, it is evident that the consumption of grain, by means of distilleries or breweries, is highly favourable to the production of it in great quantities. They are even favourable to the existence of plenty, or of abundance of bread for the use of the people. In good seasons, by affording a ready market, they give activity to the husbandman, and in bad seasons their operations can be arrested by law, and the superfluous quantity of grain which was meant to be consumed by them, can be converted into human food. Thus they operate in some measure like a great public granary, in which provisions should be kept against an accidental scarcity.

It may sometimes happen, that by the character of the age in which he lives, and the state of the market which it produces, a husbandman may find himself most profitably employed, when rearing a kind of food which is by no means the most advantageous to the population of his country. This takes place, when he is employed in preparing butchers' meat instead of bread; that is, when he finds it more profitable to rear upon his lands vegetables which can only be consumed by cattle, and thus contribute only in an indirect manner to the sustenance of the human species, than to cultivate those vegetable productions which are suited to the human stomach, and which therefore directly and immediately afford subsistence to man. According to Archdeacon Hislop's comparative statement, lately published, the weight of food from an acre of arable land, on the average of three years, a fallow year being included, is nine and a half times greater than from an acre of feeding stock; and, according to the calculations of the Rev. Dr Walker, at Collington, professor of natural history at Edinburgh, a Scots acre of land in pasture, fed with sheep, produces only 120 pound weight of meat, whereas the same land will yield 1280 pounds of oat meal, or above ten times as much. Let it even be supposed, then, that one pound of mutton contains in itself as much substantial nourishment for the human constitution, as

two

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Pasturage-
and agri-
culture
compared.

Theory.

Profit from
different
Vegetables.

two pounds weight of oat meal; still it will follow, that land cultivated for the production of oats, will support a population five times greater in number, than can be supported by the same land when used for the pasture of sheep; and, where one million of people are found to exist upon a territory occupied in the one way, between five and six millions of people might exist upon the same land if it were cultivated for raising grain, and if the inhabitants would consent to use it as their food. Were any contrivance adopted, of the nature of those already mentioned, for converting the succulent roots of potatoes, carrots, &c. into dry meal or flour; the same proportional difference of population would continue to exist, between nations in which that kind of flour should be consumed as human food, and in which it should be used for feeding cattle: For a man always commits an enormous waste of food, who, instead of eating grain himself, gives it to an inferior animal, in the expectation of afterwards receiving an equivalent, by devouring the flesh of that animal.

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Population
greatest
where men
live on ve-
getable
food.

Accordingly, it seems impossible for any nation to reach a very extensive degree of population, unless the people at large consent to subsist chiefly, or altogether, upon vegetable food. In China, where the practice of polygamy renders the families of rich men very numerous, and where the equal distribution of the property among the children of the same family prevents the accumulation of great wealth by individuals, almost all persons have found it convenient or necessary to relinquish the ordinary use of butchers meat, and to have recourse to vegetable food. It is only in consequence of this circumstance, that the enormous population of that empire is supported. The quantity of butchers meat consumed in a country will, therefore, always in spite of every agricultural improvement, set bounds to its population. A nation of hunters and shepherds, who live upon wild animals, or upon flocks and herds, must always be few in number. By agriculture, the numbers of these animals may indeed be increased; but the men who can find subsistence by consuming them, will always be five or six times fewer in number, than might live upon the same territory, were the cattle expelled, and the lands occupied in rearing food to be immediately used by man.

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Circum-
stances that
lead hus-
bandmen to
prefer pas-
turing to
the rearing
of grain.

With these general considerations, however, the practical agriculturist, or husbandman, may have nothing to do. To succeed in his profession, he must accommodate himself to the public taste, or to the state of the market around him; and must consider what commodity, whether grain or butchers meat, will there bring the best reward for his labour. He may even find the state of the market affected by other circumstances, than the mere taste of the public for butchers meat, in preference to vegetable food; although that must always be of great importance among a luxurious people. Conquering nations, who extend their political dominion over distant regions, never fail to draw to their native country a very great portion of the wealth of the vanquished states. The victorious nation never fails, in such cases, to contain a great number of wealthy individuals, whose revenue is not derived from the cultivation of their native soil, or from any branch of manufacture or of commercial industry carried on by them upon it; but which consists

of money drawn from the remote provinces of the empire, in consequence of estates possessed, or fortunes acquired there, in the service of government. The result of such circumstances naturally is, that these wealthy individuals not only live at home in a luxurious manner, and increase to an immense extent the consumption of butchers meat by themselves and their numerous retinues; but for the sake of ostentation, and as the only means of employing their wealth, they maintain great numbers of carriages and of riding horses. To support such establishments, they themselves not only convert large tracts of territory from arable into pasture lands; but even the whole husbandmen of the country are induced to do the same, to derive a profit from supplying them with butchers meat, and with food for their pleasure horses. In the mean time, the grain that may be wanted for the consumption of the people, whether rich or poor, being a commodity which is easily preserved and transported, must be bought from foreign nations, by a portion of the superfluous wealth of the state; and thus a rich and prosperous people may come to depend upon foreigners for a morsel of bread; and when these foreign nations happen to experience an unfortunate season, this wealthy people may suffer all the horrors of famine upon a fertile soil, and in the midst of overflowing treasures.

Such was the state of Italy under the ancient Romans. Every part of it was adorned with the parks and villas and gardens of the nobles, who derived their revenues from the remote parts of the empire. This seat of dominion exhibited a picture of boundless splendour and magnificence. But the soil was entirely occupied in the service of ostentation or of luxury; and Italy, one of the most fertile corn countries in Europe, depended for grain upon Egypt, and the western provinces of Africa that border upon the Mediterranean. Such also, though perhaps in an inferior degree, seems to be the present state of Great Britain. It has acquired vast and fertile and populous provinces, within the torrid zone in the east, from which individuals are annually transporting home immense treasures obtained in the public service. In the west, also, within the same torrid zone, by a great expence of treasure and of human lives, the cultivation of certain valuable commodities has been established; and from estates situated there, individuals residing at home now derive great revenues. The principles which regulate human affairs are unalterable; and in every age the same causes are attended with the same consequences. What occurred in ancient Italy, took place among us soon as the possession of distant territories had leisure to display its natural effects. Britain formerly not only produced abundance of grain, for the support of its own inhabitants, but it possessed a considerable surplus for exportation. After the acquisition of foreign possessions, this surplus produce gradually ceased to exist; and it appears from documents, which the legislature has acknowledged to afford authentic and complete evidence of the truth of the fact; that, for twenty years past, notwithstanding all our agricultural improvements, and the waste lands that have been brought under the plow, the produce of grain is annually becoming more and more unequal to the consumption; and this decrease appears in some measure to keep pace with the increasing value of our distant possessions. In the mean time, we are annually coming under

Profit from
different
Vegetables.

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under the necessity of purchasing larger and larger supplies of grain, from the foreign states of Europe or of North America; and thus these nations, without undergoing the imputation of usurpation, and without encountering the hazard of an unfriendly climate, have been enabled through the medium of our luxury to obtain a share of the riches of Hindostan, and of the profits of our West India cultivation. In the mean time their agriculture is encouraged, while we are made to depend upon them for the necessaries of life. After all, it appears unreasonable, and would perhaps be improper, to regret a state of affairs, which is the result of national aggrandisement, and of the superiority and successful enterprizes of our countrymen. Still, however, it is obviously to be wished, that, so far as agriculture is concerned, we could be restored to the state of independence which our ancestors enjoyed, when they were able, from their own soil, to supply themselves with the necessaries of life: such a state is sometimes necessary to the independent existence of a community, and is at all times conducive to its welfare. It can only however be produced by means of agriculture. Therefore,

Ye generous Britons, venerate the *Plough*,
And o'er your hills and long withdrawing vales,
Let autumn spread her treasures to the sun;
So with superior boon may your rich soil,
Exuberant, nature's better blessings pour
O'er every land, the naked nations clothe,
And be th' exhaustless granary of a world!

THOMSON.

SECT. IV. *General Principles of Cultivation.*

It is not our intention here to enter into a minute disquisition, concerning the nature of vegetables, or the different substances with which they may be connected, in their growth or in their decay. Such investigations, in a proper arrangement of the sciences, ought to be left to chemistry; but even that science, so far as vegetable substances are concerned, is still in such a state of imperfection, that a detail of the experiments and opinions of philosophical chemists, concerning vegetables, would as yet afford but a very trifling portion of useful information to the husbandman. We shall therefore content ourselves with here stating such general remarks, as appear necessarily connected with the important art of which we are now treating.

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Nature of
the growth
of vege-
tables.

A vegetable is not to be regarded merely as a piece of matter, or as a mixture of certain material substances. It is an organized being, possessed of life, which it derived from another similar organized being that existed previous to itself; and this former organized and living being derived its constitution from a parent stem, which grew out of a still older plant, up to an antiquity of which we have no knowledge. A vegetable, in this manner, not only has a birth, but it also has a growth, which is supported by food that it takes in and conveys by peculiar organs to the particular parts for which it is destined. When it has arrived at maturity, or reached the perfection of its form and constitution, a vegetable like an animal begins to decay, and finally dies, and, by a process of putrefaction, is converted into a kind of earth.

To the life of vegetables, in the same manner as to

the life of animals, the presence of atmospheric air is necessary. They also require a certain moderate degree of heat; without which their growth cannot proceed, although a great degree of it is utterly fatal even to their texture. That they require moisture, is equally obvious; as appears from the ordinary effect of rain, or of the continued want of it, upon fields and plants. They require likewise to be inserted in the earth, or in some way connected with a collection of its particles; for although some plants, particularly the bulbous-rooted kinds, vegetate in pure water and air alone, it appears that they acquire little addition of solid substance, and that neither they, nor any of the other larger plants, reach perfection, or produce seed, unless planted in the earth, or supplied with a portion of it.

As all soils are by no means equally adapted for sup-⁷⁴porting vegetables, or bringing them to maturity, it is necessary for the husbandman to attend to their nature, and the modes in which they may be altered or ameliorated for his use. Independent of these hard concretions, which obtain the name of stones or rocks, it is to be observed, that the looser and more divisible earth which covers most part of the surface of the globe, and receives the appellation of *the soil*, may, upon the whole, and with sufficient accuracy for practical purposes, be divided into four kinds, which are in general mixed with each other, but which receive their name, in ordinary language, from the kind that predominates, or is most abundant. These are sand, clay, chalk, and garden mould. Of these, sand and clay are in some measure the opposites of each other, while chalk forms a kind of medium between them. Sand allows water to filter rapidly through it, and speedily becomes dry, while clay is extremely tenacious of moisture; but a mixture of chalk renders sand considerably more tenacious of water, while it renders clay more loose, and easily penetrated. None of these soils are valuable for the purposes of agriculture.—Sand does not sufficiently retain water for the use of vegetables; nor does clay suffer their roots to expand with freedom in quest of nourishment. Chalk, or, as it is usually called, a calcareous soil, is not of itself adapted for raising useful plants; for, although it may not have the mechanical defects of sand and clay, yet, it is found by experience to be of little value to them, either in consequence of its tendency to destroy their texture by its corrosive quality, that is, by having too much chemical affinity with the materials of which they consist, or from its not containing within itself the proper materials necessary to them as food.

The fourth kind of soil we have denominated garden mould; because it is in its highest perfection when it approaches nearest to the rich black earth which receives that appellation. This is the most proper of all kinds of soil for rearing the whole of those vegetables which are accounted valuable in our climate. In proper circumstances, that is, with a moderate degree of heat and of moisture, it never fails to send forth and to bring to perfection an abundant crop. In proportion to the degree in which any soil consists of this black mould, its value increases. If, therefore, a husbandman could cover the portion of territory allotted to him with a tolerable depth of this kind of soil, nothing more would be necessary to the success of his enterprizes, as

Theory.

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he could rear whatever vegetables he thought fit, in perfection, and in great profusion. It is to be observed, however, that this kind of mould or soil cannot be relied upon as permanent. If crops of grain should be taken from it year after year, it would soon lose its fertile qualities, and become unfit for the purposes of a prosperous agriculture. Here then is the remarkable difference between this kind of soil and the three others that were formerly mentioned, sand, clay, and chalk. Whatever properties these possess are unperishing, and can only be altered or modified by the operation of a fierce heat. Unfortunately, however, in their pure state, as already mentioned, they are of little value to the husbandman; and it is only in proportion to the degree in which they are mixed with the dark coloured or garden mould, that they become adapted to his purposes: but as the qualities of this mould are of a transitory nature, it is of the utmost importance, and ought indeed to form the great basis of every theory of agriculture, to explain how they may be preserved in existence, or restored when lost.

75 Nature of garden mould.

Communications to the Board of Agriculture, vol. ii.

76 Process by which nature fertilizes the earth.

To understand this subject correctly, it is necessary to consider the nature and origin of this fertile mould. It is evidently not one of those original substances which form a part of the great mass of the solid globe of the earth, but appears to be the result of the operations and of the destruction of living and organized beings that have existed upon it. "Were a naked rock, says Mr Headrick, in an essay which we shall afterwards have occasion to mention, suddenly thrown up from the sea or from the bowels of the earth, the first plants which nature would place upon it, would be the various species of *lichens*, and such as can subsist wholly upon what they imbibe from the air, without needing a soil in which to push their roots. These plants serve the double purpose of clothing the rock, and thus preventing the fine particles that are dissolved by air and moisture from being washed away, and, from their growth and dissolution, of accumulating vegetable soil for the sustenance of more succulent plants. The rock is thus gradually made to acquire such a depth of soil, that it becomes able to sustain not only grasses and shrubs, but may become a receptacle for the oak itself." The progress here stated is correct; but some circumstances must be added to it, to render it practically useful to the husbandman. It is to be observed then, that animal substances, after they have ceased to form a part of a living body, have a tendency to proceed rapidly into a state of putrefactive fermentation, by which the greatest part of their mass is rendered volatile. When animal substances are mingled with vegetables, they speedily communicate their own fermentation or putrefaction to the vegetables, which by means of it are decomposed, fall to pieces, and are transformed into that kind of black earth, which we have called garden mould, and which forms the most fertile of all soils for the production of vegetables. It is by this process then, that is, by the fermentation of vegetable by means of animal substances, that the surface of this globe has been fertilized, or a black and rich mould produced upon it, as we daily see taking place in a variety of situations. No sooner do the small lichens or mosses cover the face of the naked rock, or gravel, or clay, than a variety of species of small animals appear, and feed upon them. As the

plants and animals die in succession, their substances mingle and give rise to the putrefaction already mentioned, which is productive of a small portion of soil. A new race of plants of greater strength and bulk rises upon the ruins of the first, and supports larger animals, all destined in their turn to perish and to increase the quantity of fertile soil. More valuable grasses soon supplant the original small and coarse vegetables, and the spot assumes the appearance of a rich verdure. New species of animals also begin to inhabit it: snails and worms abound; and by their remains contribute to the dissolution of the roots of plants, which everywhere penetrate the new soil, and to the decomposition of the stems which periodically fall down. When the soil has acquired sufficient depth, it is sheltered by shrubs; and, lastly, by forest trees, under the shade of which the larger animals exist. The trees shed their leaves every season, and every season consequently gives an additional layer or *stratum* of fertile mould to the soil: and thus while the forest endures, the fertility of the territory on which it stands continues to be augmented by its spoils, and by the bodies of the animals which repair to it for shelter.

This process, by which nature gives fertility to the earth, or creates the rich mould on which vegetables flourish, ought to be imitated by the husbandman; and, in fact, it has been imitated in consequence of a knowledge that is derived from experience and from practice, rather than from the general speculations of science. The imitation of nature upon this point constitutes the art of producing manures, which will be afterwards considered. The principle upon which it proceeds, rests upon this foundation, which is known to be true in fact, that the fermentation of animal and vegetable substances produces that kind of dark rich mould which forms the most fertile soil.

In what way, or by what peculiar operation, this kind of mould or soil becomes so highly conducive and subservient to the growth of plants, is a point of more difficult research, and is fortunately of less importance to be known to the practical agriculturist. It may be observed, however, that this mould possesses, in an eminent degree, all the requisites necessary to the success of vegetation. It retains moisture, which is so necessary to that process, without, at the same time, keeping hold of it with that retentiveness which, in clay, has the effect of injuring the roots of the plants. As this mould consists of the remains both of animal and vegetable life, it necessarily contains an immense variety of ingredients which have different degrees of chemical affinity to each other. By the operation of these affinities in bringing the different substances into new combinations, a great quantity of heat must be continually produced or evolved, as occurs in so many chemical processes. By this heat the roots of the plants will be nourished, especially when assisted by the heat which they themselves throw out or produce when germinating. Thus, by the kind of soil now mentioned, or by the aid of manure, the defects of a cold and ungenial climate may, in some measure, be rectified, and the seeds and roots of vegetables may be supplied with due and seasonable warmth. It is also probable, that what is called the exhausted state of a soil, in consequence of much plowing, and many crops having been taken from it, may chiefly arise from this circumstance, that

77 Conjecture about exhausted soils.

Principles of that all the chemical affinities having at last operated, every particle of the soil remains at rest, and no more heat is produced by the activity of its parts.

That plants growing in fertile mould, like that now mentioned, derive nourishment or food from it, cannot be doubted, since we see, that when taken out of it, or placed in another but less favourable soil, they speedily go into decay. What the particular substances are, however, which they take from it, has not been discovered. But it appears from the minuteness of the extreme fibres of the roots of plants, that the food taken in by them must be soluble in water, or in a liquid state when taken in by them. Accordingly, their food is actually found to ascend through their organs in a liquid form. Of this liquor or sap there are two kinds, the ascending and the descending. The ascending sap is that which rises in the spring; and by cutting a short way through the bark into the wood of many trees, large quantities of it may be drawn off, without injury to their health or growth. This sap ascends to the leaves, and there undergoes some change by the action of the air; for the leaves of vegetables appear to perform to them an office similar to that which is accomplished in animals by the organ called the *lunges*. From the leaves the sap, thus changed, descends to every part of the plant, and contributes to its growth by becoming a part of its substance. It would seem, however, that the liquors which circulate in plants, not only undergo a change at the leaves, but also at their first entrance by the vessels of the roots; for if several different kinds of trees are ingrafted upon the same common stock, each of them is able to derive the sap peculiar to itself from the sap of the common stock. Thus also the chemists have informed us, that vinegar, called by them the *acetous acid*, is found variously combined in the ascending sap of various trees; but it has never yet been discovered, that vinegar exists in any perceptible quantity in vegetable mould. That substance, therefore, must be formed by the root, by bringing together the ingredients of that acid which it finds and selects in the earth.

When any plant, whether great or small, is put into a close vessel, and strongly heated, allowing only the smoke to escape, the residue is in all cases of the same nature, and is called *charcoal*, or by the chemists *carbon*. Of this carbonaceous matter a considerable quantity is always found in rich garden mould, derived no doubt from the remains of vegetable substances of which that mould was originally formed. This carbonaceous matter, however, or charcoal, being insoluble in water, cannot in its ordinary state enter into the vessels of growing vegetables; but, as it is rendered soluble by a variety of combinations, it is no doubt found out in such a state by the fibres of growing roots, and conveyed upwards in the juice. But as all vegetable mould, and the charcoal or carbonaceous matter which it contains, is the result of the ruins of vegetation, and as the lichens or vegetables of the coarsest and simplest kind, which originally grow upon the naked stone, have no other nourishment than water and atmospheric air, it is probable, that out of these materials they are capable of forming the charcoal, which constitutes the basis of their form, and of the constitution of every other vegetable. It is true, that the chemists still regard carbon or charcoal as a simple and

uncompounded substance; and they have not found it in water, nor in atmospheric air, unless in the most minute degree, resulting probably from the combustion of fires and the breathing of animals in inhabited countries. But although chemists have not hitherto been able to find charcoal in the three simple substances, oxygen, hydrogen, and azote, of which atmospheric air and water are composed, it seems evident, that the mighty Chemist who contrived this world and the constitution of vegetables, finds no difficulty in forming it of those materials by means of their organization. Hence we rather think, that water and air must constitute the original food of the simplest and coarsest kind of plants; but if this idea be true, it is to be regarded as a fact that is more curious in speculation than useful in practice: for it is certain, that the more valuable and larger vegetables, which it is the business of the husbandman to cultivate, cannot be reared to perfection without the aid of vegetable mould. Though they may possess, therefore, the power of deriving a portion of their solid substance, or of the carbonaceous matter which they contain, from common air and water, they cannot obtain the whole by this means, and require the aid of the remains of former vegetation. It is thus that one system is seen to pervade every part of nature, as through all her works one class of animated beings only enjoys life in consequence of the destruction of another. Thus the carnivorous animals consume those that live upon vegetables; and thus, in like manner, one species of vegetables only subsists upon the ruins, and is fed by the substance, of a former generation of plants.

Besides animal substances, there are some minerals that have a tendency to accomplish the decomposition of vegetables, and thereby to reduce them into a state of mould, possessing in a great degree the qualities of the garden mould that is produced by the fermentation of the remains of animals and vegetables, the formation of which has now been described. Of the minerals that have this tendency, lime is the chief, and indeed the one commonly in use, either pure or when combined with clay under the form of marl. To the effect of lime, therefore, we shall now call the attention of the reader.

Where the ground has been suffered to remain uncultivated for many ages, producing all that time succulent plants which are easily putrefied, and trees, the leaves of which likewise contribute to enrich the ground by their falling off and mixing with it, the soil will in a manner be totally made up of pure vegetable earth, and be the richest, when cultivated, that can be imagined. This was the case with the lands of America. They had remained uncultivated perhaps since the creation, and were endowed with an extraordinary degree of fertility; nevertheless we are assured by one who went to America in order to purchase lands there, that such grounds as had been long cultivated, were so much exhausted, as to be much worse than the generality of cultivated grounds in this country. Here, then, we have an example of one species of poor soil; namely, one that has been formerly very rich, but has been deprived, by repeated cropping, of the greatest part of the vegetable food it contained. The farmer who is in possession of such ground, would no doubt willingly restore it to its former state, the present question is, What

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78 Vegetables are the food of each other.

79 One species of poor soil destroyed by lime.

Principles of Cultivation. What must be done in order to obtain this end? We have mentioned several kinds of manures which long practice has recommended as serviceable for improving ground: we shall suppose the farmer tries lime or chalk; for, as we have already seen, their operations upon the soil must be precisely the same. This substance, being of a septic nature, will act upon such parts of the soil as are not putrefied, or but imperfectly so; in consequence of which, the farmer will reap a better crop than formerly. The septic nature of the lime is not altered by any length of time. In ploughing the ground, the lime is more and more perfectly mixed with it, and gradually exerts its power on every putrescible matter it touches. As long as any matter of this kind remains, the farmer will reap good crops; but when the putrescible matter is all exhausted, the ground then becomes perfectly barren; and the caustic qualities of the lime are most unjustly blamed for *burning* the ground, and reducing it to a *caput mortuum*; while it is plain the lime has only done its office, and made the soil yield all that it was capable of yielding.

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A species of
poor soil
meliorated
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When ground has been long uncultivated, producing all the time plants, not succulent, but such as are very difficultly dissolved, and in a manner incapable of putrefaction; there the soil will be excessively barren, and yield very scanty crops, though cultivated with the greatest care. Of this kind are those lands covered with heath, which are found to be the most barren of any, and the most difficultly brought to yield good crops. In this case lime will be as serviceable as it was detrimental in the other: for by its septic qualities, it will continually reduce more and more of the soil to a putrid state; and thus there will be a constant succession of better and better crops, by the continued use of lime when the quantity first laid on has exerted all its force. By a continued use of this manure, the ground will be gradually brought nearer and nearer to the nature of garden mould; and, no doubt, by proper care, might be made as good as any: but it will be as great a mistake to imagine, that, by the use of lime, this kind of soil may be rendered perpetually fertile, as to think that the other was naturally so; for though lime enriches this soil, it does so, not by adding vegetable food to it, but by preparing what it already contains; and when all is properly prepared, it must as certainly be exhausted as in the other case.

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Poor soils,
how resto-
red.

Here, then, we have examples of two kinds of *poor* soils; one of which is totally destroyed, the other greatly improved, by lime, and which therefore require very different manures; lime being more proper for the last than dung; while dung, being more proper to restore an exhausted soil than lime, ought only to be used for the first. Besides dunging land which has been exhausted by long cropping, it is of great service to let it lie fallow for some time: for to this it owed its original fertility; and what gave the fertility originally, cannot fail to restore it in some degree.

By attending to the distinction between the reasons for the poverty of the two soils just now mentioned, we will always be able to judge with certainty in what cases lime is to be used, and when dung is proper. The mere poverty of a soil is not a criterion whereby we can judge; we must consider what hath made it poor. If it is naturally so, we may almost infallibly conclude, that

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it will become better by being manured with lime. If it is *artificially* poor, or exhausted by continual cropping, we may conclude that lime will entirely destroy it.—We apprehend, that it is this *natural* kind of poverty only which Mr Anderson says, in his *Essays on Agriculture*, may be remedied by lime; for we can scarce think that experience would direct any person to put lime upon land already exhausted. His words are,

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"Calcareous matters act as powerfully upon land that is naturally poor, as upon land that is more richly impregnated with those substances that tend to produce a luxuriant vegetation." Mr Anderson's opinion concerning lime.

"Writers on agriculture have long been in the custom of dividing manures into two classes, *viz.* *Enriching* manures, or those that tended directly to render the soil more prolific, however sterile it may be; among the foremost of which was dung: *Exciting* manures, or those that were supposed to have a tendency to render the soil more prolific, merely by acting upon those enriching manures that had been formerly in the soil, and giving them a new stimulus, so as to enable them to operate anew upon that soil which they had formerly fertilized. In which class of stimulating manures, *lime* was always allowed to hold the foremost place.

"In consequence of this theory, it would follow, that lime could only be of use as a manure when applied to rich soils—and when applied to poor soils, would produce hardly any, or even perhaps hurtful, effects.

"I will frankly acknowledge, that I myself was so far imposed upon by the beauty of this theory, as to be hurried along with the general current of mankind, in the firm persuasion of the truth of this observation, and for many years did not sufficiently advert to those facts that were daily occurring to contradict this theory.—I am now, however, firmly convinced, from repeated observations, that lime, and other calcareous manures, produce a much greater *proportional* improvement upon poor soils than such as are richer;—and that lime alone, upon a poor soil, will, in many cases, produce a much greater and more lasting degree of fertility than dung."

Thus far Mr Anderson's experience is exactly conformable to the theory we have laid down, and what ought to happen according to our principles. He mentions, however, some facts which seem very strongly to militate against it; and indeed he himself seems to proceed upon a theory altogether different.

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"Calcareous matter alone (says he) is not capable of rearing plants to perfection;—mould is necessary to be mixed with it in certain proportions, before it can form a proper soil. It remains, however, to be determined, what is the due proportion of these ingredients for forming a proper soil." Query concerning the nature of a proper soil.

"We know that neither chalk, nor marl, nor lime, can be made to nourish plants alone; and soils are sometimes found that abound with the two first of these to a faulty degree. But the proportion of calcareous matter in these is so much larger than could ever be produced by art, where the soil was naturally destitute of these substances, that there seems to be no danger of erring on that side. Probably it would be much easier to correct the defects of those soils in which calcareous mat-

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ters superabound, by driving earth upon them as a manure, than is generally imagined; as a very small proportion of it sometimes affords a very perfect soil. I shall illustrate my meaning by a few examples.

“Near Sandside, in the county of Caithness, there is a pretty extensive plain on the sea coast, endowed with a most singular degree of fertility. In all seasons it produces a most luxuriant herbage, although it never got any manure since the creation; and has been from time immemorial subjected to the following course of crops.

“1. Bear, after once ploughing from grass, usually a good crop.

“2. Bear, after once ploughing, a better crop than the first.

“3. Bear, after once ploughing, a crop equal to the first.

“4. 5. and 6. Natural grass, as close and rich as could be imagined, might be cut, if the possessor so inclined, and would yield an extraordinary crop of hay each year.

“After this the same course of cropping is renewed. The soil that admits of this singular mode of farming, appears to be a pure incoherent sand, destitute of the smallest particle of vegetable mould; but, upon examination, it is found to consist almost entirely of broken shells: the fine mould here bears such a small proportion to the calcareous matter, as to be scarce perceptible, and yet it forms the most fertile soil that ever I yet met with.

“I have seen many other links (downs) upon the sea shore, which produced the most luxuriant herbage, and the closest and sweetest pile of grass, where they consisted of shelly sand; which, without doubt, derive their extraordinary fertility from that cause.

“A very remarkable plain is found in the island of Jir-eyc, one of the Hebrides. It has been long employed as a common: so that it has never been disturbed by the plough, and affords annually the most luxuriant crop of herbage, consisting of white clover and other valuable pasture grass, that can be met with anywhere. The soil consists of a very pure shelly sand.

“From these examples, I think it is evident, that a very small proportion of vegetable mould is sufficient to render calcareous matter a very rich soil. Perhaps, however, a larger proportion may be necessary when it is mixed with clay than with sand; as poor chalky soils seem to be of the nature of that composition.”

To these examples brought by Mr Anderson, we may add some of the same kind mentioned by Lord Kames. His lordship having endeavoured to establish the theory of water being the only food of plants, though he himself frequently deviates from that theory, yet thinks it possible, upon such a principle, to make a soil perpetually fertile.

“To recruit (says he), with vegetable food, a soil impoverished by cropping, has hitherto been held the only object of agriculture. But here opens a grander object, worthy to employ our keenest industry, that of making a soil perpetually fertile. Such soils actually exist; and why should it be thought, that imitation here is above the reach of art? Many are the instances of nature being imitated with success. Let us not despair while any hope remains; for invention never was exercised upon a subject of greater utility. The

attempt may suggest proper experiments: it may open new views: and if we fail in equalling nature, may we not, however, hope to approach it? A soil perpetually fertile must be endowed with a power to retain moisture sufficient for its plants, and at the same time must be of a nature that does not harden by moisture. Calcareous earth promises to answer both ends: it prevents a soil from being hardened by water; and it may probably also invigorate its retentive quality. A field that got a sufficient dose of clay marl, carried above 30 successive rich crops, without either dung or fallow. Doth not a soil so meliorated draw near to one perpetually fertile? Near the east side of Fife, the coast for a mile inward is covered with sea sand, a foot deep or so; which is extremely fertile, by a mixture of sea shells reduced to powder by attrition. The powdered shells, being the same with shell marl, make the sand retentive of moisture; and yet no quantity of moisture will unite the sand into a solid body. A soil so mixed seems to be not far distant from one perpetually fertile. These, it is true, are but faint essays; but what will not perseverance accomplish in a good cause?”

Having thus, in a manner, positively determined with Mr Anderson, that no dose of calcareous matter can possibly be too great, we cannot help owning ourselves surprised on finding his lordship expressing himself as follows: “An overdose of shell marl, laid perhaps an inch, and an inch and an half, or two inches thick, produces, for a time, large crops: but at last it renders the soil a *caput mortuum*, capable of bearing neither corn nor grass; of which there are too many instances in Scotland. The same probably would follow from an overdose of clay marl, stone marl, or pounded limestone.”—To account for this, he is obliged to make a supposition directly contrary to his former one; namely, that calcareous matter renders the soil *incapable* of retaining water. This phenomenon, however, we think is solved upon the principles above laid down, in a satisfactory manner, and without the least inconsistency.

As to rendering soils perpetually fertile, we cannot help thinking the attempt altogether chimerical and vain. There is not one example in nature of a soil perpetually fertile, where it has no supply but from the air and the rain which falls upon it. The above recited examples can by no means be admitted as proofs of perpetual fertility. We know, that the grass on the banks of a river is much more luxuriant than what grows at a distance: the reason is, that the water is attracted by the earth, and communicates its fertilizing qualities to it; but was the river to be dried up, the grass would soon become like the rest. Why should not the ocean have the same power of fertilizing plains near its shores, that rivers have of fertilizing small spots near their banks? We see, however, that it hath not: for the sea shores are generally sandy and barren. The reason of this is, that the waters of the ocean contain a quantity of loose acid*; and this acid is poisonous to plants: but abstracting this acid part, we hesitate not to affirm, that sea water is more fertilizing than river water. It is impossible to know how far the waters of the ocean penetrate under ground through a sandy soil. Where they meet with nothing to absorb their acid, there the ground is quite barren; but in passing through an immense quantity of broken shells, the calcareous matter, we are very certain, will absorb all the acid;

Principles of
Cultivation.85
Inconsisten-
cy in Lord
Kames's
theory.86
Perpetual
fertility of
soils chime-
rical.

* See Water.

Principles of acid; and thus the soil will be continually benefited by its vicinity to the ocean. All the above fields, therefore, are evidently supplied with nourishment from the ocean: for if the salt water has sufficient efficacy to render fields which are in its neighbourhood barren, why should it not render them fertile when the cause of barrenness is removed from its waters?

After all, the field in Caithness, mentioned by Mr Anderson, seems to have been perpetually fertile only in grass; for though the second year it carried a better crop of bear than it did the first, yet the third year the crop was worse than the second, and only equal to the first. Had it been ploughed a fourth time, the crop would probably have been worse than the first. Ground is not near so much exhausted by grass as corn, even though the crop be cut and carried off; and still less if it only feeds cattle, and is manured by their dung; which appears to have been the case with this field. Lord Kames, indeed, mentions fields in Scotland, that, past memory, have carried successive crops of wheat, pease, barley, oats, without a fallow, and without a manure; and particularizes one on the river Carron, of nine or ten acres, which had carried 103 crops of oats without intermission and without manure: but as we are not acquainted with any such fields, nor know any thing about their particular situation, we can form no judgment concerning them.

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Clay and
sandy soils.

Besides the two kinds of soils above mentioned, there are others, the principal ingredient of which is clay or sand. The first of these is apt to be hardened by the heat of the sun, so that the vegetables can scarce penetrate it in such a manner as to receive proper nourishment. The second, if it is not situated so as to receive a great deal of moisture, is very apt to be parched up in summer, and the crop destroyed; nor has it sufficient adhesion to support plants that have few roots and grow high. From these opposite qualities, it is evident that these two soils would be a proper manure for one another: the clay would give a sufficient degree of firmness to the sand, and the sand would break the too great tenacity of the clay. According to Dr Home's experiments, however, sand is the worst manure for clay that can be used. He recommends marl most. To reduce clay ground as near as possible to the form of pure vegetable mould, it must first be pulverized. This is most effectually performed by ploughing and harrowing; but care must be taken not to plough it whilst too wet, otherwise it will concrete into hard clots which can scarcely be broken. After it is pulverized, however, some means must be taken to keep it from concreting again into the same hard masses as before. According to Lord Kames, though clay, after pulverization, will concrete into as hard a mass as before, if mixed with water; yet if mixed with dunghill juice, it will not concrete any more. Lime also breaks its tenacity, and is very useful as a manure for this kind of soil.

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Fertility of
the earth li-
mited.

The conclusion we wish the practical farmer to draw from our theory is, That there is a certain limit to the

fertility of the earth, both as to duration and to degree, at any particular time: that the nearer any soil approaches to the nature of pure garden mould, the nearer it is to the most perfect degree of fertility; but that there are no hopes of keeping it perpetually in such a state, or in any degree of approximation to it, but by constant and regular manuring with dung. Lime, chalk, marl, &c. may be proper to bring it near to this state, but are absolutely unfit to keep it continually so. They may indeed for several years produce large crops; but the more they increase the fertility for some years, the sooner will they bring on an absolute barrenness; while regular manuring with plenty of dung will always ensure the keeping up the soil in good condition, without any occasion for fallow. What we have said concerning the use of lime, &c. applies likewise to the practice of frequent ploughing, though in a less degree. This tends to meliorate ground that is naturally poor, by giving an opportunity to the vegetable parts to putrefy; but when that is done, it tends to exhaust, though not so much as lime. A judicious farmer will constantly strive to keep his lands always in good condition, rather than to make them suddenly much better; lest a few years should convince him that he was in reality doing almost irreparable mischief, while he fancied himself making improvements. As for the ridiculous notions of stimulating the ground by saline manures, we hope they will never enter the brain of any rational practitioner of agriculture.

Vegetables
proper to be
raised for
Meliorat-
ing the Soil.

SECT. V. *Of the different kinds of Vegetables proper to be raised with a view to the Melioration of Soil.*

THE methods of meliorating soils, which we have mentioned above, consisting of tedious and laborious operations that yield no return at first, it is natural for a farmer to wish for some method of meliorating his ground, and reaping crops at the same time. One very considerable step towards the melioration of ground is its pulverization. This is accomplished by repeated ploughings (A), as already mentioned; especially if performed in autumn, that the ground may be exposed to the winter's frost; but these ploughings yield no crop as long as the field is not sown. By planting in the field, however, those vegetables whose roots swell to a considerable bulk, the ground must constantly be acted upon by the swelling of their roots in all directions: and thus the growing of the crop itself may be equal, or superior, in efficacy to several ploughings, at the same time that the farmer enjoys the benefit of it. The plant most remarkable for the swelling of its roots is the potatoe; and by none is the ground meliorated more, or even so much. They are not, however, equally proper for all soils. In clay they do not thrive, nor are palatable; but in hard gravelly or sandy soils, they grow to a large size, and are of an excellent quality. Turnips likewise contribute to meliorate the

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Soil pulver-
ized by
certain ve-
getables.

R r 2

ground,

(A) This, however, must be understood with some limitation: for it appears from experience, that many light and thin soils receive detriment rather than advantage from frequent ploughings; particularly in summer, when the sun exhales the nutritive particles in great abundance.

Of Destroying Weeds.

ground, by the swelling of their roots, though not so much as potatoes. They have this advantage, however, that they will thrive in almost any soil. In clay ground, pease and beans thrive exceedingly well, and therefore are proper in this kind of soil as a preparatory for other kinds of grain. These push their roots deep into the ground, and cover it with their leaves more than other crops; so that the sun has not so much access as when it is covered with other kinds of grain. Wherever any of these kinds of vegetables are raised, it is observable, that more or less blackness is communicated to the soil: an evident sign of its melioration; this being the colour of the true vegetable mould, or *loamy soil*, as it is called.

Besides the above-mentioned plants, carrots, parsnips, cabbages, and all those vegetables which sink their roots deep in the ground, answer the same purpose of loosening and pulverizing the earth: but as they will not thrive but on ground already well cultivated, they cannot be raised to any advantage for the purpose of meliorating a poor soil.

It hath been customary in many places, particularly in England, to sow turnip, pease, buck-wheat, &c. and then to plough them down for manuring the land. This being similar to that operation of nature by which she renders the uncultivated soils so exceedingly fertile, cannot fail of being attended with singular advantages; and might be looked upon as preferable even to driving dung on the land to fatten it, was it not attended with the entire loss of a crop for that year.

In addition to this, it may be proper to remark, that an idea has been entertained with regard to the succession of vegetables to each other, which ought not to be overlooked, as at some future period it may lead to important consequences. It has been supposed, that the roots of plants, or at least of some plants, possess a power of throwing out, as excrementitious, a part of the substances which they have taken in, but which are no longer necessary for their subsistence or growth. It is undoubted, at least, that while by some plants the soil seems to be rendered altogether unfit for the production of certain others, it is rendered by different plants extremely well adapted to their growth. Thus wheat succeeds uncommonly well after drilled beans; and these two vegetables have even been repeated for a great number of years in rotation, without any deficiency or failure of crop.

SECT. VI. Of destroying Weeds.

WHAT we have already said regarding the cultivation of the soil, respects only the fitting it for producing all kinds of vegetables indiscriminately. Experience, however, shows, that the ground is naturally much more disposed to produce and nourish some kinds of vegetables than others; and those which the earth seems most to delight in, are commonly such as are of very little use to man; but if neglected, will increase to such a degree, as entirely to destroy the plants intended to be raised, or at least hinder them from coming to perfection, by depriving them of nourishment. The clearing the ground of weeds, therefore, is an article no less necessary in agriculture, than the disposing it to produce vegetables of any kind in plenty.

The weeds may be divided, according to the time of their duration, into *annual*, or such as spring from a seed, and die the same year; and *perennial*, that is, such as are propagated by the seeds, and last for a number of years. The first kind are the least noxious and most easily destroyed. For this purpose it will be sufficient to let them spring up till near the time of ripening their seed, and then plough them down before it comes to maturity. It is also of service to destroy such weeds as grow in borders or neglected corners, and frequently scatter their seeds to a great distance; such as the thistle, dandelion, rag-weed, &c. for these are sufficient to propagate their species through a deal of ground; as their seeds are carried about with the wind to very considerable distances. A farmer ought also to take care, that the small seeds of weeds, separated from corn in winnowing, be not sown again upon the ground; for this certainly happens when they are thrown upon a dunghill; because, being the natural offspring of the earth, they are not easily destroyed. The best method of preventing any mischief from this cause, would be to burn them.

Perennial weeds cannot be effectually destroyed, but by removing the roots from the ground, which is often a matter of some difficulty. Many of these roots strike so deep in the ground, that they can scarcely be got out. The only method that can be depended upon in this case, is frequent ploughing, to render the ground as tender as possible; and harrowing with a particular kind of harrow, which shall hereafter be described, in order to collect these pernicious roots. When collected, they ought to be dried and burnt, as the only effectual method of ensuring their doing no further mischief.

There is a particular species of weed, peculiar only to grass lands, of a soft spongy nature, called *fog*, which it is found very difficult to exterminate. Where the land can be conveniently tilled, this weed may be destroyed by covering it with a crop of pease, potatoes, &c. or, passing a heavy roller over the ground will be of great service; for fog owes its origin to too great a laxity of the soil, and will not grow on firm ground.

Besides these kinds of weeds which are of an herbaceous nature, there are others which are woody, and grow to a very considerable size; such as broom, furze, or whins, and thorns. *Broom* is an evergreen shrub, that thrives best in a sandy soil; and there it grows so vigorously, as scarcely to admit any grass under it. It propagates by seed which grows in pods; and these, when fully ripe, break with violence, scattering the seeds all around. Thus, a field which is overgrown with broom, besides the old plants, always contains an infinite number of young ones: so that though the old plants die when cut over, a fresh crop constantly springs up. It may, however, be destroyed by frequent ploughing and harrowing, in the same manner as other perennial weeds are; for it does not for some time carry any seed, and the frequent ploughing encourages the vegetation of all those seeds that are already in the ground, which cannot fail of being destroyed by frequent repetitions of the operation. Another method of destroying broom, is by pasturing the field where it grows with sheep. A few of the old bushes may be left as a shelter, and these will be in a good measure prevented from

Some vegetables seem to enrich the soil.

Of Destroying Weeds.

91 Weeds divided into annual and perennial.

92 Perennial weeds, how destroyed.

93 Broom, furze, &c. how destroyed.

Diseases of Plants. from spreading by the cropping of the sheep. These animals are very fond of broom, and greedily devour every young shoot; so that if any remain after the first year, there will not be a vestige the second. If this method of extirpating broom is equally effectual with that of frequent ploughing, it is certainly much more profitable, as there is no food more nourishing to sheep than young broom. Broom, however, is said to have a singular effect upon sheep: it makes them drunk so effectually, that when heated with a little driving, they tumble over, and lie without motion.

The *whin* is a fine evergreen shrub, carrying a sweet-smelling flower all the year round. It propagates both by seed and by its roots, which spread sometimes to the distance of 10 or 12 feet; and hence, when once established, it is with difficulty extirpated. The best method is to set fire to the whins in frosty weather; for frost has the effect to wither whins, and make them burn readily. The stumps must then be cut over with a hatchet; and when the ground is well softened by rain, it may be ploughed up, and the roots taken out by a harrow adapted to that purpose. If the field is soon laid down to grass, the whins will again spring up in great abundance from the seeds, and small parts of the roots left in the ground. In this case, pasturing with sheep is an effectual remedy; as they are no less fond of young whins than of young broom; and if there are a sufficient number, they will not leave a single plant above ground. But if grass is not immediately wanted, the most effectual method of clearing a field of whins, is by reiterated ploughings.

The *thorn*, or *bramble*, spreads its roots very wide, and at the same time sinks them deep in the earth. Though cut in the winter, it rises, and comes to such perfection as to carry fruit in summer. It can only be extirpated by ploughing up the ground, and collecting the roots.

One effectual plan, which, as will afterwards appear, is practicable in many more situations than it has hitherto been applied to, for destroying these and all other woody shrubs and plants, together with a great number of weeds that are of no value upon pasture grounds, consists of flooding the land, by directing over it a stream of water. By means of such a device, all whins and other shrubs are completely rotted and destroyed.

SECT. VII. Of the Diseases of Plants.

As some of the most valuable kinds of vegetables are liable to suffer much by diseases peculiar to themselves, it is of much importance to the husbandman to be aware of this circumstance, and to adopt every known mode of protecting his crop against them. At the same time, as the principles of vegetable life are by no means well understood, the causes and the cure of the most serious diseases affecting plants still remain under a great degree of obscurity, and the most experienced and intelligent husbandmen express great uncertainty respecting the measures to be adopted for preventing their appearance. Hence it appears most proper to introduce the consideration of them in this place before we proceed to the practical part of the subject; and as wheat is accounted the most valuable

kind of grain, we shall begin with the diseases to which it is exposed.

Wheat chiefly suffers from two diseases, the blight and the mildew. Of the blight in wheat we shall give an account upon the authority of an essay by Robert Somerville, Esq; surgeon, 1st Battalion, 8th Fencible Regiment, inserted in the communications to the Board of Agriculture*, giving a statement of the nature and appearance of the blight which occasioned the failure of the crop in 1795.—When the crop had just shaken the flowers, and the grains were beginning to form, most of them seemingly in a healthy manner, it was observed that many of the blades and stalks were rather of a dirty green colour, and in two weeks thereafter there appeared upon them great numbers of small red insects. As the season advanced, these insects not only increased in size, but became more numerous, and in almost every field the grain began to manifest unequivocal symptoms of disease, which were so formidable, that in many instances a total loss was dreaded, and in not a few cases, one half of the crop was actually destroyed. The minute symptoms of the blight were these:

1st, In the very early stages of the disease, and before the ear was affected, the blades and stalks were marked with black and rusty spots. These spots seemed to be occasioned by a glutinous substance deposited upon them, easily soluble in water, and which could be readily washed off by rubbing the stalks with a wet cloth. Some spots, however, were white, and these seemed to be owing to wounds or punctures made by vermin; the leaf having, to a certain extent, in consequence of these, withered and become white. As the season advanced, the black and rusty-coloured spots became larger and more numerous: and when the grain began to ripen, not only the blades but the straw were almost entirely coloured with black spots.

2d, After the crop had begun to shoot, and was in the ear, many of the heads were entirely empty. Where the stalk was green, and to appearance tolerably healthy, but the ear at the same time withered and without grain, the misfortune seemed to have arisen from an injury done to the neck of the ear, at the place of its junction with the stalk. There the outer rind was destroyed all round, which must have cut off the circulation between the ear and the stalk, as happens in trees that have had their bark destroyed all round.

3d, Many of the ears were entirely empty in the upper part, while the lower half was well filled. In these cases, the injury seemed owing to the rind being destroyed about the middle of the ear, at that place which separated the full from the empty part, and was similar to the injury done in the preceding case where the whole ear was destroyed.

4th, In very many cases the ears had a plump well-filled pickle and an empty husk alternately. In these the injury seemed owing to a wound inflicted at the bottom of the empty grains, where they are joined to the stalk, and which had taken place while they were in flower, preventing them from making any farther progress.

5th, Many ears, though not entirely empty, contained only small shrivelled grains, or what are called hungry

Diseases of Plants.

96 Diseases to which wheat is liable.

* Vol. ii.

97 Blight in 1795.

94 Shrubs are destroyed by flooding the land.

95 The diseases of vegetables are ill understood.

Diseases of
Plants.

hungry pickles. These seemed to have escaped any accident till they had made some progress in filling, after which they became stationary and ripened prematurely. On examination they were found to be injured at the place where they were joined to the stalk, in the same manner as was already mentioned, in the case of those that had empty heads or ears. Like these also the whole ear was in some cases ill filled. In others only half of it was in that state, and in a very great number the ears consisted of a well and ill filled grain alternately. Without a single exception, the whole of the ill filled or hungry grains, were wounded at the place of their insertion into the ear.

6th, A number of ears, though well filled, were upon opening the husks found almost entirely covered with black and rusty spots, nearly resembling those already described, and like them also they were easily rubbed or washed off. The downy part of many of these grains, when examined carefully with a good glass, appeared to contain several small white transparent globes, resembling the eggs of insects.

7th, In many fields, especially such as had been fallowed and well manured for the wheat crop, a great number of plants were entirely withered from top to bottom. The decay, in most of these cases, took place when the wheat was beginning to shoot. No injury was visible in these cases upon the blade or stalk, but on examining the roots, a worm was found at every one of them.

Lastly, As the crop began to whiten, the dark or rusty spots on the straw and ears became more numerous, and appeared more conspicuous. In place of putting on a white or yellow appearance, the whole crop looked as if it had been sprinkled with soot.

The whole of these symptoms appeared to arise from the attack of an insect, and from the injuries and depredation which it committed upon the plants. This insect when first distinguishable by the eye, was of a red colour, and so soft as to be killed by the slightest pressure. As it increased in size the colour gradually changed to a dirty black, at which it became stationary. During its growth it lost its soft texture, and in proportion as its colour darkened it became hard, and as it were covered with a crust or shell upon the back. It is said to be not uncommon, and to be met with at all times, even in the best fields of wheat, though its numbers are infinitely increased in late wet seasons. From its eggs appearing to lodge upon the well-filled ears of the grain, it might be considered as in danger of being propagated to the succeeding crop. On this account our author hazards some conjectures upon the best means of preventing future danger from it. One of these consists of the use of lime mixed up with all manure, with a view to prevent insects from being generated in it. It is also suggested that the manure, by means of which slugs and worms are chiefly supposed to be produced, ought not to be plowed into the ground in autumn, but applied as a top dressing in the spring; because it is understood that manure, exposed to the sun and air, has much less tendency to foster insects, than when it is covered up in the earth.

Another disease, which is much more destructive to wheat, and much more frequently met with, is the mildew. It is of two kinds, the black and the red. In both cases it consists of a quantity of seemingly coarse pow-

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Mildew
is red or
black, cal-
led smut.

Diseases of
Plants.

der attached to the grain in the ear, or loosely surrounding it; in consequence of which it is evidently prevented from filling or arriving at perfection. The black kind of mildew is by far the most frequent and the most pernicious. It is most generally known in England by the name of *smut*, and in Scotland by that of the *black*, both of which are sufficiently expressive. Concerning the cause of this disease various opinions have been entertained. Dr Home, in his Principles of Agriculture and Vegetation, ascribes it to an over luxuriance of growth. He is of opinion, that too great an abundance of juices in a vegetable will produce diseases similar to those occasioned by repletion in animal bodies, viz. stagnations, corruptions, varices, cariofites, &c. along with the too great luxuriance we have just now mentioned, which he expresses by "too great an abundance of water shoots." Hence he is induced to class the smut among diseases arising from this cause, it being a corruption happening most in rainy seasons and to weak grain. Like other contagious diseases, he tells us, the smut may be communicated from the infected to healthful grain. As a preventive he recommends steeping the seed in a strong pickle of sea salt. Besides the effect which this has upon the grain itself, it is useful for separating the good from the bad; the best seed falling to the bottom, and the faulty swimming on the top of the liquor.

Independent of this notion of an over luxuriance of growth, it may be observed, that two opinions have chiefly been supported by persons who have speculated and written on this subject. One opinion is, that the mildew consists of a great multitude of parasitical plants adhering to the grains of wheat, living upon it, and thereby consuming its substance. Another opinion is, that it consists of great numbers of insects and of eggs of insects, whose form is too small to be distinguishable by the naked eye. The first of these opinions has been adopted by the celebrated Italian writer Fontana, and the other by certain writers of our own country.

Fontana endeavours to refute the hypothesis, that the dust of the mildew consists of animal eggs, by the following experiment. He closely confined the grains of the mildew between two glass plates, in such a manner as necessarily to break the supposed eggs. He then, with an accurate microscope, observed them while crushed in succession. No liquid or glutinous juice proceeded from them, though great force was used in crushing them; but they appeared wholly to consist of tough resisting substances altogether unlike real animal eggs: their being fastened to the stalk or leaves of the grain, appeared also to militate against such a supposition. From a variety of microscopic observations, he is of opinion, that the powder of the black mildew or smut consists of a great multitude of small plants attached to the grain by a slender fibre. These parasitical plants, though extremely small, he thinks sufficiently regular. With regard to the red mildew he admits, that it appears to be composed of an immense multitude of minute eggs. After a variety of experiments and observations, however, he thought he discovered, that these apparent eggs are in truth the heads or fruit of very fine threads fixed on the ear of corn; that these threads or stems are exceedingly fine and transparent, which gives the appearance of eggs to their outward extremities. These stems or tails

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Opinions
concerning
the cause of
mildew.

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Fontana's
opinion.

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Diseases of Plants.

are represented by him, as infinitely finer than those of the black mildew; and their heads, which resemble eggs, may be separated from them by the slightest shock. From all his observations he concludes, that both the black and the red mildew consist of real plants, though, perhaps, of an imperfect kind; and that they enfeeble and waste the crop by absorbing the nutritive juices of the plant. He observes, that, if a heavy rain speedily fall on an extensive mildew, washing the leaves and stalks affected, it presently disappears with hardly any damage to the corn; because the small plants having hardly taken root are easily dispersed before any mischief is done. He thinks, that the damage occasioned by this disease may sometimes be moderated or diminished by cutting down the grain before it is fully ripe. In this case, he says, that the crop will be less than it ought to be; but still it will be considerably greater than if the customary time of harvest is waited for, when the disease will have leisure to produce greater mischief.

In our own country, and particularly by Mr Somerville, in the essay already quoted, the smut in wheat has been regarded as consisting of a great variety of insects. He also founds his opinion upon microscopic observations, and apprehends that from them he has clearly ascertained the existence of the insects; and he thinks that it is communicated to other grain by contact, in consequence of the passage of the insects. Hence he endeavours to explain the utility of steeping the seed in pickles before it is sown, with a view to the destruction of such insects.

101 Pickles to prevent smut or mildew.

It is to be remarked, that in all countries a great variety of these pickles has been contrived, with a view to prevent the existence of smut in wheat, some of which we shall now mention. One of the most common is the salt pickle, consisting of a solution of common salt in water, of such strength as that an egg will swim in it. To the wheat, after it has been washed in this pickle, and the light grains removed, some new slaked lime is added, and carefully mixed with it with a wooden shovel, till it attain a sufficient degree of dryness, in which state it is committed to the earth. A pickle consisting of very stale urine has also been recommended to be used for washing wheat that is meant to be used as seed. It is attended with this disadvantage, however, that if the urine is very stale, and if any length of time is suffered to elapse, in consequence of rain or other accidents, before the grain is sown, its vegetative power is said to be greatly injured by the corrosive quality of the volatile alkali with which such urine abounds. This is more particularly the case when quicklime is added to the urine; as the alkali is then brought into a caustic state.

Another pickle has been proposed to the Board of Agriculture by an Italian physician, J. B. Scandella. It is prepared and used in the following manner:—Take of nitre, three pounds; alum, one pound; vitriol, six ounces; verdeggris, three ounces; wood-ashes, well sifted, six pounds: Boil the whole in a copper with five pails of water for an hour, then remove them from the fire, and pour them into a large vessel; then add sixteen pails of water, in which half a bushel of quicklime has been previously dissolved: mix the whole intimately, and allow them to stand till they are quite cold. In this steep two bushels and a half of

wheat are to be plunged, and left for about six hours, stirring it up frequently with a wooden shovel, and skimming off what rises to the surface; the wheat is then to be withdrawn, and spread out till it is dry enough for sowing. The process is thus to be continued until the whole quantity of seed intended to be sown is pickled. The above steep is generally sufficient for preparing about twenty-four bushels of wheat.

Another pickle has been recommended, consisting of a decoction in water of Barbadoes aloes, tobacco, and hellebore powder. A committee of the Royal Society of Agriculture at Paris, in 1786, recommended the following pickle for the same purpose, contrived by M. Tillet:—Pour upon 50 pounds of wood-ashes, 900 pints of water; stir it well for three days, and then draw off. Wash the black wheat in so many clear waters as not at last to dirty it. Heat the lye, so as just to bear the hand in it; slake in the hot lye one pound of lime to every seven or eight pints of it. Into the preparation dip the seed in baskets many times. For want of wood-ashes use potash, seven or eight pounds for 100 pints of water.

Communications to the Board of Agriculture, vol. ii. *Annals of Agriculture*, vol. ix.

In addition to these it may be remarked, that a solution of arsenic in water is made use of in some countries of England, as a pickle in which they wash or steep the grain previous to its being sown, for the purpose of protecting the future crop against smut.

102 Arsenic used to prevent the mildew.

The most complete set of experiments, however, which we have met with upon the subject, was made by Arthur Young, Esq. at present secretary to the Board of Agriculture. December 7. 1787, he sowed 14 beds with the same seed wheat as black with the dew smut as any he ever saw.

103 Arthur Young, Esq. his experiments to prevent mildew.

- N^o 1. Sown dry, nothing done to it.
- 2. Washed well in clean water.
- 3. Washed in lime-water.
- 4. Washed in a lye of wood-ashes.
- 5. Washed in an arsenic and salt mixture.
- 6. Steeped in lime-water four hours.
- 7. Ditto in the lye four hours.
- 8. Ditto in the arsenic four hours.
- 9. Ditto in lime-water 12 hours.
- 10. Ditto in the lye 12 hours.
- 11. Ditto in the arsenic 12 hours.
- 12. Ditto in the lime-water 24 hours.
- 13. Ditto in the lye 24 hours.
- 14. Ditto in the arsenic 24 hours.

RESULT.

| | |
|-----------------------|------------------|
| N ^o 1. Had | 377 smutty ears. |
| 2. Ditto | 325 |
| 3. Ditto | 43 |
| 4. Ditto | 31 |
| 5. Ditto | 28 |
| 6. Ditto | 12 |
| 7. Ditto | 3 |
| 8. Ditto | 1 |
| 9. Ditto | 6 |
| 10. Ditto | 0 |
| 11. Ditto | 4 |
| 12. Ditto | 0 |
| 13. Ditto | 0 |
| 14. Ditto | 5 |

A proposal has also been made, to destroy by means of

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Plants.

104
Erfkine of
Marr's re-
medy.

of heat the insects which are supposed to propagate the disease called *smut* from the seed wheat to the future crop. The following directions for that purpose are extracted from the Agricultural Survey of the County of Clackmannan, by J. F. Erfkine, of Marr, Esq. "Let the wheat be laid upon the kiln, about three or four inches thick: the kiln to be heated middling strong with blind coal; the wheat to continue on the kiln for 24 hours, but turned frequently. After taking it off the kiln, it must be allowed 24 hours to cool; during which time it must be frequently turned; then put it through the fanners once or twice. After the wheat has lain a few hours on the kiln, and the fire begins to have effect, a great number of very small worms, formerly undiscovered by the eye, appear on the top of the grain, and are soon destroyed by the heat. These come from blacked wheat, or other corns, that could not be suspected to be indifferent; or may lie in or on good wheat; which worms continuing, (when not thus killed) might consume the corn after it is thrown into the earth, thereby checking the growth entirely, or preventing it from having the strength it otherwise would have to bring forth a strong productive stalk. This practice is said to have been brought from Ireland, and is recommended as preferable to pickling. It might perhaps be performed with greater success by the use of a kiln heated by the steam of boiling water, in the way already mentioned, as such a kiln would instantly afford a fixed and known degree of heat, which could in no case be exceeded."

After all, however, both from the reason of the thing, and from the concurring opinion of the most experienced and intelligent farmers, we think ourselves authorized to say, that the husbandman will act imprudently if he place entire and complete confidence in any one of the remedies above mentioned. His safest and best plan for procuring crops of wheat free from smut is this: In the first place, he ought to procure seed from a situation in which the grain has risen absolutely free from this disease. He ought next to exert the greatest care in cleaning out, in the most anxious manner, his whole barns and their floors, and every place within doors into which his grain may come, and in which diseased grain has formerly been kept: with this view it may probably be necessary to whitewash the walls with a mixture of quicklime and water, which will prove an effectual remedy. After having adopted these precautions, it may still be necessary, with a view to secure a sound and full crop, to plunge the seed into a strong pickle of salt and water, with a view to float the lighter grains, which ought to be skimmed off and laid aside for poultry, to which they may be given after being washed in fresh water. No future change of seed will be necessary. Of the farmers who have adopted this judicious mode of proceeding, there is no instance recorded of any one whose crop has suffered by smut; on the contrary, they have usually derived a considerable profit from becoming the furnishers of grain for seed to all their neighbours.

105
Diseases pec-
uliar to
saffron.

The want of nourishment in plants may be easily known by their decay; in which case, the only remedy is, to supply them with food, according to the methods we have already directed, or to remove from their neighbourhood such other plants as may draw off the nourishment from those we wish to cultivate.—In the

Memoirs of the Academy of Sciences for 1728, Mr Du Hamel mentions a disease, which he calls *le mort*, that attacks saffron in the spring. It is owing to another plant, a species of trefoil, fixing some violet-coloured threads, which are its roots, to the roots of the saffron, and sucking out its juice. This disease is prevented by digging a trench, which saves all the unaffected.

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Plants.

The bad qualities, and unequal distribution of the juices of plants, are the occasion of so few of the diseases to which vegetables in this country are subject, that we forbear to mention them at present. Most of the diseases of our plants are owing to external accidents, particularly to the depredations of insects.—The insects by which the greatest devastations are committed in this country are, snails, caterpillars, grubs, and flies. The snails and caterpillars feed on the leaves and young shoots; by which means they often totally destroy the vegetable. Where the plants are of easy access, these vermine may be destroyed by sprinkling the vegetable with lime-water; for quicklime is a mortal poison to creatures of this kind, and throws them into the greatest agonies the moment they are touched with it. On trees, however, where this method cannot so well be followed, fumigation is the most proper; and, for this purpose, nothing is better than the smoke of vegetables not perfectly dry. In some cases the eggs of these destroying creatures may be observed, and ought without doubt immediately to be taken away. On the fruit trees, as apples, pears, medlars, on some forest trees, the oak and dwarf maple especially, and the white and black thorn in hedges, a kind of little tufts are to be observed, resembling at first sight withered leaves twisted by a cobweb, about the uppermost twigs or branches. These contain a vast number of little black eggs, that in the spring produce swarms of caterpillars which devour every thing. To prevent this, all the twigs on which these cobwebs appear should be taken off and burnt as soon as possible. This ought to be done before the end of March, that none of the eggs be allowed sufficient time for hatching.

106
Vegetables
destroyed
by insects.

107
Insects de-
stroyed by
lime-water.

The grubs are a kind of worms which destroy the corn by feeding upon its roots; they are transformed every fourth year into the beetles called *cock-chaffers*, *may-bugs*, &c. they are very destructive when in their vermicular state, and cannot then be destroyed because they go deep into the ground. When become beetles, they conceal themselves under the leaves of trees, where they seem asleep till near sunset, when they take their flight. It is only now that they can be destroyed, and that by a very laborious method; namely, by spreading pack-sheets below the trees in the day-time when the beetles are in their torpid state, then shaking them off and burning them. Some time ago they made such devastations in the county of Norfolk, that several farmers were entirely ruined by them; one gathered 80 bushels of these insects from the trees which grew on his farm. It is said, that in 1574 there fell such a multitude of these insects into the river Severn, that they stopped and clogged the wheels of the water-mills.

108
Grubs.

Turnips, when young, are apt to be totally destroyed by a multitude of little black flies, from thence called the *turnip-fly*. As a preventive of these, some advise the seed to be mixed with brimstone; but this

109
Turnip-fly.

Theory.

Diseases of Plants. ¹¹⁰ Prevented by fumigation, &c. this is improper, as brimstone is found to be poisonous to vegetables. The best method seems to be the fumigation of the fields with smoke of half-dried vegetables. For this purpose weeds will answer as well as any. This fumigation must no doubt be often repeated, in order to drive away the innumerable multitudes of these insects which are capable of destroying a large field of turnips.

Some have supposed that the fly is either engendered in new dung, or enticed by it; and have therefore advised the manure to be laid on in the autumn preceding, by which it loses all its noxious qualities, while its nutritive ones are retained, notwithstanding these might be supposed liable in some degree to be exhaled by the sun. This method is said to have been ascertained by experiments; and it is added, that another material advantage accruing from autumn manuring for turnips is, that all the seeds contained in the dung, and which of course are carried on the land with it, vegetate almost immediately, are mostly killed by the severity of the winter, and the few that remain seldom avoid destruction from the ploughshare.

¹¹¹ Various remedies against the turnip-fly.

The following method of sowing has also been recommended as a preventive of the fly:—"About Midsummer, take the first opportunity when it rains, or there is an apparent certainty of rain approaching, to sow your turnip seed; if about the full moon, the better. In this case, neither harrow, brush, nor roll, after sowing. The natural heat of the ground at that season, and the consequent fermentation occasioned by copious rain, will give an astonishingly quick vegetation to the seed, which in a few days will be up and out of all danger from the fly. At all events, sow not till it rains; it is better to wait a month, or even longer, for rain, than to sow (merely for the sake of sowing about the usual time) when the ground is parched with heat. By the scorching of the sun, the oil and vegetative quality of the seed are exhausted; and the few weak plants that come up will be destroyed by the fly before they can attain strength to put forth their rough leaves. The fly infests the ground abundantly in dry hot weather, but does no injury in rain. The falling rain will sufficiently wash the turnip seed into the ground without harrowing it in; which, instead of merely covering, too often buries this small seed at so great a depth, as never afterwards to get above ground."

The following remedies are also recommended as having often proved successful:—A small quantity of foot sown over the land at their first appearance. Branches of elder, with the leaves bruised, drawn in a gate over them. Musk mixed with the seed before it is sown. And sulphur burnt under it, after moistening it with water in which tobacco has been steeped.

But showers on the plants, as soon as they appear above ground, are esteemed the best preservatives. They enfeeble and kill the fly, and hasten the plants into the rough leaf, in which state they are out of danger.

The sweet smell of the turnip has been thought to attract the fly; upon which supposition, the remedy appeared to consist in overpowering that smell by one which is strong, fetid, and disagreeable. Hence it has been recommended, that upon an acre of turnips sown in the usual way, a peck or more of dry foot be thrown

after the ground is finished, and in as regular a way as Diseases of Plants. he sows the seed.

Some time ago an insect, called the *corn butterfly*, committed such ravages while in its vermicular state, in France, that upwards of 200 parishes were ruined by it; and the ministry offered a reward to the discoverer of an effectual remedy against this destroying worm. The cure which was at last discovered was, to heat the corn in an oven so much as not to destroy its vegetative power, but sufficiently to destroy the small worms which made their nest in the substance of the grain, and at last ate out the substance so completely, that nothing could be got from the husk even by boiling it in water. It is certain, that though insects can bear a great deal of cold, they are easily destroyed by a slight degree of heat; nor is the vegetative power of corn easily destroyed, even when kept for a long time in a pretty strong heat. This method must therefore be very effectual for destroying all kinds of insects with which grain is apt to be infested: but care must be taken not to apply too great a heat; and the adjusting of the precise degree necessary to destroy the insect, without hurting the corn, will be attended with some difficulty.

¹¹² Corn-butterfly.

The curled disease in potatoes has long been a subject of investigation and experiment among farmers: and the knowledge of its cause and cure seems yet to remain a desideratum. The Agricultural Society at Manchester, a few years ago, offered a premium for discovering by actual experiment the cause of the disease in question; and a great variety of letters were, in consequence, addressed to them upon the subject.—As these contain many interesting observations both on the disease itself and the best methods hitherto adopted for preventing it, the following abstract of them may not improperly be introduced in this place.

¹¹³ The curled disease in potatoes.

I. According to the writer of the first letter, this disease is caused by an insect produced by frost or bad keeping before setting; and the newest kinds, such as have been raised within these nine or ten years, are most apt to curl, because they will not stand to be kept in winter and spring before setting, as the old kinds will. In autumn 1776, he got up a bed of potatoes to lay by in winter, leaving plenty in the ground as regular as possible; and, before the severity of winter came on, covered part of the bed with straw and pease-haulm, and left the other part of the bed uncovered. That part of the bed which was covered was quite free from curled ones; but the uncovered part produced a great many curled, owing, as the writer says, to frost and severity of the weather.

¹¹⁴ Various methods of prevention.

II. This writer had about a quarter of an acre of potatoes, well manured with cow and horse dung, and took the greatest care in picking the fine smooth-skinned potatoes for sets; yet nine out of ten parts were curled. He attributes the cause of this disease to a white grub or insect, which he found near the root, about half an inch long, with eight or ten legs, its head brown and hard; as upon examining a number of the curled roots, he found them all bitten, chiefly from the surface to the root, which of course stopped the progress of the sap, and threw the leaf into a curl. The uncurled roots were not bitten. He tried a few experiments as follow:—First, he put foot to the insects in the rows

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for two days; and after that, he put lime to them for the same time, but they still kept lively; next he put a little salt, which destroyed them in a few hours. From which he infers, that if coarse salt were put into the ground at the time the land is preparing for potatoes, it would effectually cure this distemper.

III. In this letter, the cause of the disease is attributed to the method of earthing the stems while in cultivation; and the branch, striking root into the new earthed-up soil, it is said, produces potatoes of such a nature as the year following to cause the disease complained of.

To prevent the disease, it is recommended to take the sets from those potatoes that have not bred any from the branch covered; or, otherwise, to dig the part the sets are to be raised from.

IV. According to this writer, the disorder proceeds from potatoes being in old-tilled or worn-out ground; for though these potatoes may look tolerably well, yet their sets will mostly, if not all, produce curled potatoes.

Hence he is convinced, that no sets ought to be used from old-tilled or couch-grass land; and that, in order to have good sets, they should be procured from land that was purposely fallowed for them; from fresh ley land, where they are not curled; or from ley land that was burnt last spring. He directs to plant them on virgin-mould, and the potatoes will have no curled ones amongst them; and to keep them for winter, from any other kind.

To avoid the uncertainty of getting good sets, he recommends crabs to be gathered from potatoes growing this year on fresh land free from curl, and the next spring to sow them on fresh ley land; and continue to plant their sets on fresh ley land yearly, which he is convinced will prevent the curl.

All the good potatoes he saw this year, either on fresh ley land or on old-tilled land, were raised from sets that grew upon fresh ley land last year; and where he has seen curled potatoes, he found, upon inquiry, the potatoe sets grew upon old-tilled and worn-out land last year. He gives as a general reason for the disorder, that the land is oftener cropt than it had used to be, much more corn being now raised than formerly.

V. In 1772, this writer planted some potatoes by accident full nine inches deep: when taken up, many of the plants were rotted, and a few curled. He kept the whole produce for seed, and planted two acres with it in 1773, not quite six inches deep. The crop was amazingly great; and he did not observe any curled plants among them. In 1774, many of these were planted in different soils; yet they were so infected with the curled disease, that not one in twenty escaped. In 1775, the complaint of this disease became general. In 1776, it occurred to him that the good crop of 1773 was owing to the accidental deep setting of 1772; and that the reason why the same seed became curled in 1774, was their being set so near the surface in 1773; and attributes the disease to the practice of ebb-setting. In 1777, he took some potatoes from a crop that was curled the year before, and after cutting the sets, left them in a dry room for a month. Half were planted in ground dug fourteen days before; the other half, having been steeped in a brine made of whitster's ashes for two hours, were also planted in the

same land at the same time. The steeped ones came up ten days before the others, and hardly any missed or were curled. The unsteeped ones generally failed, and those few that came up were mostly curled.

He therefore advised as a remedy, 1. That the potatoes intended for next year's sets be planted nine inches deep. 2. That they remain in the ground as long as the season will permit. 3. That these sets be well defended from frost till the beginning of March. 4. That the sets be cut a fortnight before planting. 5. That they be steeped, as above, two hours in brine or lye. 6. That the dung be put over the sets. And, 7. That fresh sets be got every year from sandy soils near the coast, or on the shore.

P. S. At planting, the hard dry sets should be cast aside, for they will probably be curled. Curled potatoes always proceed from sets which do not rot or putrefy in the ground.

VI. This writer had five drills of the old red potatoes, and four of the winter whites, growing at the same time in the same field. The drills were prepared exactly alike. Among the red not one was curled; the winter whites were nearly all curled. He says he has found by experience, that the red never curl.

VII. Two of the writer's neighbours had their sets out of one heap of potatoes. They both set with the plough, the one early, and the other late, in the season. Most of those early set proved curled, and most of those set late smooth; the latter on clay land.

A few roods of land were also planted with small potatoes, which had lain spread on a chamber floor all the winter and spring till the middle of May. They were soft and withered; they proved smooth and a good crop. Middle-sized potatoes, withered and soft, which had been kept in a large dry cellar, and the sprouts of which had been broken off three times, produced also a smooth good crop.

Hence he was led to think a superfluity of sap, occasioned by the seed being unripe, might cause the disease. To be satisfied in this, he asked the farmer whether he had set any of the same potatoes this year, and what was the nature of his land? He told him "he had; that they had been set on his farm fourteen years without ever curling; that his soil was a poor whitish sand, of little depth; that he let those he designed for keeping grow till they were fully ripe."

Hence he concludes, the only sure way to prevent the curl is, to let potatoes intended for seed stand till they are fully ripe, and to keep them dry all winter.

VIII. This writer set a quantity of the red potatoes, without having a curled one amongst them. His method is, when the sets are cut, to pick out such as are reddest in the inside. On digging them up at Michaelmas, he mixes none of the curled seed among the others. The curled are easily distinguished, by their stalks withering two months before the rest of the crop.

The cause of the curled disease he attributes to potatoes being of late years produced from seed instead of roots, as formerly. Such will not stand good more than two or three years, use what method you please. Last spring, he set the old red and white ruffets, and had not a curled potatoe amongst them.

On the lime-stone land about Denbigh, in North Wales,

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Diseases of Plants. Wales, they have no curled potatoes. If this be owing to the nature of that land, perhaps lime might prevent the disease.

IX. According to this writer, all sorts of grain wear out and turn wild if sown too long on the same land; the same will hold good in all sorts of pulse, pease, beans, and (as he conceives) potatoes. It generally happens, that those who have most curled potatoes plant very small sets.

Eleven years ago he bought a parcel of fresh sets, of the golden-dun kind, and has used them without change to the present year, without any being curled. This he principally attributes to his having always planted good large sets.

About four years since, he thought of changing his sets, as his potatoes were too smooth, too round, and much diminished in size. But the curl at that time beginning to be very alarming, he continued his sets till part of his crop missing last year, he was obliged to buy new sets this spring, which, being small, were curled like other people's.

He allows, that the curl has frequently happened to persons who have used large potatoes for sets; for, as all roots are not equally affected, some curled ones may be mixed with the rest.

To prevent the evil, cut your sets from clear and middle-sized potatoes, gathered from places as clear of the curl as possible; preserve them as usual till spring. If any are harder, or graze more in cutting than usual, cast them aside. He would also recommend the raising a fresh sort from the crab produced on the sorts least affected, which in Lancashire are the long-duns.

X. Set potatoes with the sprits broke off, and they will (says the writer of this letter) be curled ones; if set with the sprits on, they will not be curled. Again, take a potatoe which is sprit, and cut a set off with two sights: break one sprit off, and let the other stay on, and set it; the former will be curled, and the latter will not.

When you have holed your potatoes, take them out before they are sprit, and lay them dry until you have set or sown them, and you will have no curled potatoes.

XI. This writer was at the expence of procuring sets at fifty miles distance, and where this disease was not known. The first year's trial was successful; the year following he procured sets from the same place, but one-fifth of his crop was infected. By way of experiment, he planted sets from roots which had been infected the year before, and some of these produced healthy plants, free from all infection.

As every effect must have a cause, he supposed it might be some insect, which, living on the leaves, gave them that curled and sickly appearance, as is the case in the leaves of many shrubs and trees. But whether the insect is lodged in the old sets, and to be destroyed at the time of planting, or, proceeding from some external cause, can only be destroyed afterwards, he is not yet certain, although he has made the following experiments.

On a piece of ground that had not been dug for 20 years, he planted four rows of sets, which he knew to be perfectly clear; the drills were two feet distant, the sets one foot distant in each drill. He then planted on the same ground four rows with sets from curled

potatoes, at equal distances; in each row were about 20 sets.

Lot 1st, The curled sets.

| | | |
|-----------------------------------|--|----------------------------|
| N ^o 1. Without manure, | | N ^o 3. In foot, |
| 2. In salt, | | 4. In quicklime. |

Lot 2d, The clear sets.

| | | |
|-----------------------------------|--|----------------------------|
| N ^o 1. Without manure, | | N ^o 3. In foot, |
| 2. In salt, | | 4. In quicklime. |

Those planted in salt and foot in both lots were destroyed. In Lot 1st, N^o 1. and 4. all curled. Lot 2d, N^o 1. and 4. quite clear.

This experiment was made on a supposition that the insect lodged in the set, and must be destroyed on planting. But of that he is not fully satisfied. He repeated salt, foot, and quicklime, on the branches of several curled potatoes. Salt destroyed all he touched with it. Lime and foot had, he thought, a partial effect on the plants. After some time, they appeared almost as healthy as the rest. Thus, although he had done little towards the cure, he flatters himself he has pointed out the cause, the insects on the curled plants being not only very numerous, but visible to the naked eye.

XII. This writer ascribes the cause of the disease to the frost, and bad keeping in winter and spring before setting. They are liable to be damaged by frost after they are set; but this may be prevented by covering. If it be asked, why frost did not injure them formerly? he answers, it is only the new kinds which are apt to curl. To this may be added, that less care is now taken of the seed than formerly. To prevent the latter, let them remain in the ground covered with haulm or litter till the time they are wanted for setting: and, in case no frost touches them afterwards, they will be free from the disease.

XIII. This writer says, the red potato was as generally planted as the winter white and the Lincolnshire kidney are now. The first, being a later potato, did not sprout so early as the others. The white sprout very early, and therefore should first be moved out of the place where they have been preserved in the winter. Instead of that, they are often let remain till their roots and sprouts are matted together. On separating them, these sprouts are generally rubbed off, and they are laid by till the ground is ready; during which interval they sprout a second time: but these second sprouts, being weak and languid, will shrink, sicken, and die; and the fruit at the roots will be small, hard, ill-shaped, and of a brown colour.

Now, if putting off the sprouts once or more, before the sets are put in the ground, be the cause (as he verily believes it is) of the curled disease, an easy remedy is at hand. When the potatoes intended for sets are dug up, lay them in a west aspect as dry as possible: in such a situation they will not sprout so soon. The best time for removing most sorts, is the first fine day after the 24th of February. Cut them into sets as soon as possible, and let them remain covered with dry sand till the ground is prepared, which should be a winter fallow. Lay the sets in without breaking off any of the sprouts, for the second will not be so vigorous. This accounts for one sprout out of three from the same set being curled. The two stems not curled rose from two later eyes, and were first

S f 2 sprouts.

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sprouts. The sprout curled was a second, the first having been rubbed off.

XIV. This writer says, that last spring one of his neighbours cut and set, in the usual way of drilling, some loads of the largest potatoes he could procure; and more than half of them proved curled. Being a few sets short of the quantity wanted, he planted some very small potatoes which he had laid by for the pigs. These being fully ripe and solid, there was not a curled plant among them. He apprehends, the others being curled was owing to their not being fully ripe. A crop of potatoes, set this year in rows on ground that had borne a crop of them last year, were mostly curled; but many plants came up from seed left in the ground last season, and there was not a curled one among them.

XV. Of late years, this writer says, great improvements have been made in setting potatoes and cutting the sets. The ground is dressed cleaner and dunged stronger. Many people, in drilling, wrap up the sets entirely in the dung; by which means, though their potatoes are larger, the disease seems to be increased. They also cut their sets out of the richest and largest potatoes, which is perhaps another cause of this evil. In cold countries, where they set their own seed, which has grown on poor land, with less dung, they have no curled plants. On the contrary, when they bought rich and large potatoes for seed, they have been curled in great quantities. He believes, the richness and largeness of the seed to be the cause of the evil; for he does not remember to have seen a curled stem which did not spring from a set of a large potato.

XVI. This writer apprehends the curled disease in potatoes to proceed from a defect in the *planta seminalis*, or seed plant; and from comparing curled ones with others, there appeared to be a want of, or inability in, the powers of expanding or unfolding the parts of the former; which, from this defect, forms shrivelled, starved, curled stems. On examining some of the sets at the time of getting the crop, he found them hard and undecayed; so hard, indeed, that some of them would not be soft with long boiling. This led him to think, that some manures might have the same effect on them as tanners ooze has on leather, and so harden them, that the embryo plant could not come forth with ease; but a closer examination taught him otherwise, and that they grow equally in all manures.

Some have thought that the fermentation is occasioned by too great quantities being heaped together; but the writer has seen an instance, wherein a single potato, preserved by itself, when set, produced stems of the curled kind. He thinks the most consistent and rational opinion is, that the disease is occasioned by the potatoes being taken from the ground before the stamen, or miniature plant, is properly matured and ripened.

For let it be observed, that the potato, being a native of a warmer climate, has there more sun, and a longer continuance in the ground, than in its present exotic state; consequently it has not the same natural causes here to mature the seed plant as in its native state. We ought, therefore, to give all the opportunities our climate will admit for nature to complete

her work, and fit the stamen for the next state of vegetation, especially in those intended for seed. But if the potato be taken up before the seed-plant be fully matured, or the air and sap vessels have acquired a proper degree of firmness or hardness, it must, when thus robbed of further nutrition, shrivel up; and when the vessels, in this immature state, come to act again in the second state of vegetation, they may produce plants which are curled.

If it be asked, why are they more common now than formerly? he answers, that before the present mode of setting them took place, people covered them, while in the ground, with straw, to protect them from frost.

If it be asked, why one set produces both curled and smooth stems? he answers, we suppose every eye to contain a *planta seminalis*; that all the embryos, or seed plants, contained in one potato, are nourished by one root; and that, as in ears of corn, some of these seed plants may be nourished before others.

One of his neighbours, last year, set two rows of potatoes, which proving all curled, he did not take them up; and this year there is not a curled one among them. Such potatoes, therefore, as are designed for seed, should be preserved as long in the ground as possible.

XVII. This writer advises such sets to be planted as grow in moss land; and, he says, there will not be a single curled one the first year. This is affirmed by the inhabitants of two townships, where they grow amazing quantities. A medical gentleman sowed last year two bushels of sets from one of the above places, and had not one curled; but on sowing them again this year, he had a few.

Notwithstanding there seems to be a diversity of opinions in the above writers, occasioned by the different appearances of their crops, and the seemingly contrary effects of the means used to prevent or cure the disease, we conceive that the following general propositions may be fairly drawn from the whole.

1. That some kinds of potatoes are (*cæteris paribus*) much more liable to be affected by the disease than the rest; and that the old-red, the golden-dun, and the long-dun, are the most free from it.—2. That the disease is occasioned by one or more of the following causes, either singly or combined: 1st. By frost, either before or after the sets are planted: 2d. From planting sets out of large unripe potatoes: 3d. From planting too near the surface, and in old worn-out ground: 4th. From the first shoots of the sets being broken off before planting; by which means there is an incapacity in the *planta seminalis* to send forth others sufficiently vigorous to expand so fully as they ought.—3. That the most successful methods of preventing the disease, are cutting the sets from smooth middle-sized potatoes, that were fully ripe, and had been kept dry after they were taken out of the ground; and without rubbing off their first shoots, planting them pretty deep in fresh earth, with a mixture of quicklime, or on limestone land.

A correspondent of the Bath Society is convinced, that, whatever may be its cause, the fault itself is inherent in the seed; and has communicated the following method of avoiding it: "I made a hot-bed in the following manner (which method I have used ever since):

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Diseases of Plants. I laid horse dung, &c. (as is generally used in making hot-beds), about 18 inches thick; over which I spread a layer of fine rich mould about four or five inches thick: upon the top of this mould I laid, in different divisions, a certain number of potatoes of various sorts, some of my own growth, and others bought from different parts, and covered thes lightly over with more mould; they soon came up. I then observed which was freeest from the blight or curl; for if there were not more than one defective in forty or fifty, I concluded I might set of that sort with safety. This method I have now practised near twelve years, and never lost my crop, or any part thereof worth mentioning; whilst my neighbours, who followed the old method, were frequently disappointed in their crops; and to the best of my knowledge, all those of my neighbours who have of late been persuaded to take the trouble of using the same means as myself, have never failed of success to their utmost wishes in one instance; nor do I ever think it will fail, if duly attended to; the fault being some hidden cause in the seed unknown at present, and I believe incurable by any means, at least which have yet come to my knowledge. My reason for planting my hot-beds so soon is, that if the frost hinder the first experiment, or they all prove bad, I may have time to make a second or third, if necessary, with different sorts of seed, before the proper season arrives for planting in the fields and grounds appointed for the great and general crops."

In addition to the interesting information upon this subject, which has been obtained by means of these societies, various other speculations about the cause and cure of this disease have of late been introduced to the notice of the public. In particular it has been strongly urged, that the disease is almost always occasioned by insects. It is said, that on looking at the roots of such potatoes as grow up curled, it will usually be found, that the bearing plant is devoured and excavated by snails, centipedes, or beetles. Sometimes also, though more rarely, the curl is supposed to arise from the leaves themselves being infected with minute animalcula. Hence, in rich soils in the neighbourhood of cities and well manured gardens, the potatoes are most subject to the curl, because such insects as devour the seed abound most in these soils. The insects are thought to prefer one potato to another. They will hardly touch a yam. A potato from a late part of the country, which has been hardly ripened, the vermin do not seem to like; but a potato that has been somewhat sweetened or mellowed by the frost, is supposed to be greedily devoured by them.

An ingenious notion concerning the cause of the disease has been suggested from attending to the history of the plant in this country. The potato plant was introduced into the island of Great Britain from a climate much warmer than ours, as early as the reign of Queen Elizabeth; but it is a singular circumstance, that the curled disease did not make its appearance till within less than 40 years ago. Indeed, the disease is said to have first occurred in the year 1764, in the very district of Lancashire where potatoes had been first cultivated. It is also said, that the Surinam potato and some other kinds which have been more recently introduced into our climate, have never yet exhibited any symptom of the curl. It is farther said,

that till within these 40 years the potato plant never brought its seeds to maturity in this country, though the roots were in full perfection. That the Surinam potato and others lately introduced do not as yet produce perfect seeds at the top of their stem; and that potatoes, which have been cultivated for a length of time in bleak and mountainous situations, are still in the same state, and do not bring their seeds to maturity. Hence it is endeavoured to be inferred, that there exists a connexion in the nature of the plant between this disease and the state of maturity to which the seed is brought. It is supposed, that the plant is unfit at once to afford mature and perfect seed at the summit of its stem, and also roots capable of propagating it in perfection. From these premises it is suggested, that, to prevent the curl, it will be necessary to procure seed potatoes from mountainous situations into which the disease has not yet come, because the plant has never produced perfect fruit at the summit of its stem; or an attempt may be made to procure more perfect seed from the ordinary kind of potatoes, by destroying the flowers, which may have the effect to prevent the plant from being exhausted by bringing to maturity both fruit at its summit and roots at its bottom. Lastly, It has been supposed, upon these principles, that the disease may be prevented by rearing potatoes from the seed produced at the summit of the stem; the mode of practising which will afterwards be explained.

In the mean time, it may be observed, that the subject has been farther discussed, in a less speculative manner, by an anonymous correspondent of the Board of Agriculture*. This gentleman does not consider the curl as a specific disease, but as an accidental debility of those plants in which it occurs; that we are not, therefore, to seek for a cure or preventive in a change of seed alone, as many have all along done, but in complete attention to all that experience shows to be necessary to an accurate culture, and to their perfect growth. In this way alone, he thinks, there is reason to expect that this very useful article of human food may be cultivated with the same success as before its dreadful enemy the curl made such havoc in our crops, as of late years it certainly has done. He describes the disease as occurring, in Mid-Lothian, most frequently from the following causes: 1st, From planting potatoes on soils altogether unfit for them. Being unable to penetrate a stiff soil, potatoes require a light, pervious, or open mould. For a long period after potatoes first appeared in the country, this circumstance was carefully attended to. They were planted entirely with the spade, in the lightest spots upon every farm. Hence, the plants rose vigorous, and no curl was seen; but on farmers wishing to extend the culture of potatoes, they were tempted to plant them on every soil, without regard to its nature, or tendency to produce this crop. 2^{dly}, Imperfect culture is described as a frequent cause of curling. A crop of potatoes is commonly strong, abundant, and free from curl, in proportion to the previous culture given to the soil, and the care taken to keep it clean after they are planted. Hence, it frequently happens, that while a farmer who cultivates this root in a negligent manner, and upon a great scale, by means of the plough, finds his crop deficient in consequence of this disease, his cottars and servants, to whose use be

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Farmer's Mag.

** Communication to the Board, vol.*

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allots small portions of potato ground, which they cultivate with the spade, obtain crops free from curl, and often double in quantity to his, in proportion to the extent of ground which they occupy. 3dly, Small roots, or too small a portion cut off along with the eye, that is to serve for seed, appears to be a cause of curl. In the case of grain, it seldom happens, unless in very fine seasons, that small seed produces a large crop; and it is thought that something similar may occur in the case of potatoes. As the young plant must always derive its earliest nourishment from the root, out of which it springs, before it is capable of seeking its food in the surrounding soil, those plants, whose early growth is best supported and fostered, must be expected to reach the greatest perfection. To subject these ideas to the test of experiment, 64 sets were planted; 16 of which were full grown potatoes, 16 from small roots, in which no curl appeared when in the field, 16 from roots raised from the seeds two years before, and 16 from roots of plants strongly curled. They were all planted in the same manner, in a light soil, in parallel furrows, with a moderate quantity of dung, and covered to the depth of three inches. Of those taken from large potatoes, none were curled, and the plants were strong and healthy. Some good plants appeared in each of the other rows, but nearly a half of the whole were curled. The proportion of curled plants was rather greatest in those raised from the seed. 4thly, Sets taken from roots that have sprouted early, and from which the germs have been rubbed, are said never to fail to produce curl. 5thly, Too much, as well as too little dung, appears to have an influence in producing curl; the first probably by corrupting the germ of the young plant, the latter by not being sufficient to produce vigorous plants. Hence, attention ought to be paid to the regular spreading of dung, which ought not to be thrown about in a careless and slovenly manner, which allows some plants to have none, while others are covered with it to the depth of several inches. 6thly, Too deep, as well as too shallow planting, gives rise to the curl. To ascertain the proper depth, 12 were planted at 18 inches deep; the same number at the depth of 16 inches, and of 14, 12, 10, 8, 7, 6, 5, 4, 3, and 2 inches; and 12 were so lightly covered, that they were not, perhaps, at the depth of one inch. The sets were all from large roots, of the same crop, cut as nearly as possible of the same size. They were all planted at the same time, in the first week of April, in a light dry soil, and they all got the same quantity of dung. The plants at the depth of 1 and 2 inches appeared first; but they were weak, and some of them curled. Those at 3, 4, and 5 inches, were all strong, and free from curl. At 6 and 7 inches, they were also healthy, and free from curl, but they were three weeks later in getting above the ground than those that were thinly covered, and the plants were neither so strong, nor the roots so large. Those planted at the depth of 8 inches rose still later, and were all weak.—Nine out of the 12 were curled. Of those planted at 10 inches deep, only four appeared; and they were so weak, that they soon withered and died. Of those deeper planted, none ever appeared. On digging them up at the end of two months, those at 16 and 18 inches deep were found unchanged; while some of those at the depth of 12 and 14 inches, had put forth some feeble

germs not exceeding the length of an inch. Those planted at 3 and 4 inches were evidently the strongest during the whole season, and their roots largest. Hence, to procure an early, abundant, and healthy crop, 3 inches appears to be the best depth for planting potatoes. 7thly, Whatever injures the new sets or the germs afterwards may produce curl: such as the trampling of horses feet at the time of planting; their being partially covered with stones or hard clods of earth; deep harrowing, when the young shoots are advancing; and grubs, snails, or insects attacking the germs at first, or the stems afterwards. Hence, 8thly, The curl was produced to an uncommon degree upon a field of stiff land, by passing a roller over it, about a fortnight after planting. 9thly, The state of the weather when the crop is young may produce the curl. Rain alone will not do so, if it be not allowed to lodge; but a long continuance of dry weather, especially with cold winds, when the shoots first appear, is apt to produce this disease, and also hoar-frosts in this early state of the crop. Hence, it is thought, that the three first weeks of April answer best for planting potatoes in the south of Scotland and north of England, as they do not, in that case, appear till the middle or end of May. From all these remarks it is concluded, that though with the best management the curl can never be completely banished from our fields, yet with due attention to the leading points above mentioned, it may be prevented from being attended with any serious mischief.

As no information upon this interesting subject ought to be overlooked, we think it necessary to state, that the following plan for preventing the curl in potatoes has very recently been laid before the public, by an anonymous correspondent of the publishers of the Farmer's Magazine, who asserts, that he has adopted it with complete success. It consists of using for seed what are called *potato beans*. These beans are a dark brown excrescence, larger than a horse bean, which grows near the ground, on the haulm or shaw, generally, it is supposed, where it has been broken or wounded. They are shaped like potatoes, and have a number of eyes, from one of which grow two small leaves. It is said, that eight or ten years ago, several of these potato beans were planted merely to try if they would grow, and that they produced a great number of common sized potatoes, but of a bad quality. These potatoes, however, being cut and planted next year, produced potatoes of an excellent quality, and in great plenty. Since that time, a number of beans have always been planted sufficient to produce enough of potatoes for next year's seed. They are planted at the same distance, and treated in every respect in the same manner with common sets; and their produce is equally plentiful. No other change of seed has ever been necessary.

SECT. VIII. *Of the Obstacles to Agricultural Improvement.*

BEFORE proceeding to the practical part of the sub-¹¹⁵ject, it may be proper to take notice of some of the moral and political circumstances which resist the progress of the art of agriculture, and which ought not to be overlooked by persons engaged, or who have an intention to engage in it.

Theory.

Obstacles
to Agriculture.

One of the first and most obvious obstacles to the improvement of this or of any other art consists of the ignorance of its practitioners, or of its being carried on by persons of an illiterate and unintelligent character, who are unable to take a comprehensive view of the principles of their profession, or who have not sufficient curiosity to inquire after the best modes of practice, or understanding to discern the value of any new practices that are explained to them. It ought never to be forgotten, that the art of the husbandman is an intricate and extensive one, and that one of the chief circumstances which has hitherto prevented its improvement has arisen, as already mentioned, from the secluded situation of persons engaged in it. They are scattered over the face of the country, instead of being collected together like other artists in towns, so as to be enabled to derive aid from each other's experience. Fortunately this difficulty is passing away, in consequence of the diffusion of agricultural knowledge, by means of the great number of publications upon that subject which are gradually introducing themselves into the remotest corners of the country. Persons receiving a liberal education, particularly at the university of Edinburgh, have now also an easier opportunity than formerly of acquiring a knowledge of the principles of this art, in consequence of the establishment of a professorship of agriculture, which has been endowed by a private gentleman, Mr Pulteney. Even with all these advantages, however, aided as they are by the exertions of the Board of Agriculture, it can never be expected that this art can reach its ultimate degree of perfection, unless a considerable number of the persons engaged in it are men of intelligent characters and good education, who will call in the improvements which are making in other sciences as well as in this art in distant countries, to the assistance of their personal experience.

A second obstacle to agricultural improvement consists of the poverty of the husbandman, or of his want of capital, to enable him fully and completely to labour the soil, and provide materials for its amelioration. Complaints have often been made with little reason, of the obstinacy of farmers, and of the tenacious manner in which they adhere to old practices, though demonstrated to be improper: But a poor man cannot afford to make experiments, or to hazard the loss of a crop for the chance of obtaining a more valuable one by some untried practice. In consequence of want of capital, large portions of territory remain in some parts of the country in a state of nature, and consequently unproductive, both to the occupier and to the proprietor. Both landlords and tenants, therefore, ought to know, that a man who engages in agriculture without a sufficient capital takes up a bad trade, in which something may be lost by both parties by the deterioration both of the soil and of the stock upon it, but from which neither the public nor themselves can derive profit.

A third obstacle to agricultural improvement sometimes arises from the possessor of the soil not having a sufficient interest in it. In barbarous nations, lands are often possessed by communities as an undivided property, without any individual member having an exclusive right to a particular spot. In such cases, the worst kind of agriculture must always prevail, for the same reason that public affairs are always worse managed

than the affairs of private persons, who find their industry stimulated not merely by a sense of duty, but by the influence of avarice, and of all the other selfish passions. Considerable portions of territory in England still remain withheld from the exertions of an improving agriculture by this state of property. But, even where the interest which the cultivator has in the soil is exclusive, it may still be too limited. Where a landlord is prevented by an entail, or other family settlement, or by narrow prejudices and a short-sighted policy, from granting leases of a proper endurance, it is never likely that the soil can be well cultivated. Every outgoing farmer will endeavour, during the last years of his lease, to do as little for the land as possible, and to take from it all that he can possibly obtain. The first years of every new lease will therefore be spent by every new farmer in repairing the damage done by his predecessor. Scarcely, however, has he accomplished this object, than he himself, if his lease be short, must set about procuring indemnity for the money he has laid out in ameliorating the soil, by scourging it in his turn, or by taking from it as heavy crops as possible, and by bestowing upon it little or no expence.

Under the same head of a want of proper interest in the soil, may be enumerated the payment of tithes, of which in England every farmer so grievously complains. Whatever money the husbandman may there lay out in improvements, is not expended for himself; as the proprietor of the tithes is entitled to draw a share of the whole additional increase, and thus becomes a partner in the profits of the enterprise, without running any risk of loss by its failure. The odium of this tax, is said to induce great numbers of husbandmen to continue their lands in pasturage, to the no small detriment of the public, from the comparative unproductiveness of human food, which attends that mode of occupying the soil. Fortunately in Scotland this evil hath been removed, by the wisdom of our forefathers, as every landlord possesses the privilege of obtaining his tithes to be fixed at a settled rate of payment for ever; and, in many cases, of having his lands altogether disburdened, upon payment of a very moderate price.

The progress of the art of agriculture in Europe was long retarded by the want of respectability which attended it, when engaged in as a profession or trade from which profit was to be derived. In the feudal times, the military profession was the only employment in which a layman of liberal education could respectably engage. Agriculture, the only art which is absolutely necessary to the existence of man, was regarded with contempt, and left in the hands of the meanest of the people. Even the most ordinary mechanics were considered as superior to persons whose employment it was; because the mechanic, residing in a town, and usually under the protection of the prince, was safe from the dominion and the insults of the petty chieftans that ruled in every part of the open country. The state of affairs is now greatly altered in this respect: More enlightened views, and a better state of society, have restored to the profession of agriculture the respectability which naturally belongs to it. It must be acknowledged, however, that the recent improvements which have taken place in the art, have contributed not a little to this change in the sentiments of mankind concerning

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cerning the persons occupied in it. It is now found, that a man may become rich by agriculture, and that there are few better ways in which a prudent and industrious man can lay out a moderate capital. In a commercial age, the path that leads to wealth is always respected and accounted honourable, and accordingly it is now not unusual for the sons of British noblemen and gentlemen, of extensive fortunes, to become apprentices to farmers.

The last obstacle to agricultural improvements, of which we shall take notice, arises in some countries from the want of judicious legislation, or proper arrangements made by the public in its favour. The produce of the art of the husbandman, and the manures of which his lands have occasion, are all bulky commodities which cannot be transported without labour and expence. Unless care is taken, therefore, to prepare and

maintain good roads throughout the country, the profits of agriculture must always be subjected to such deductions as will greatly retard its prosperity. In the same manner, if the state, from any narrow policy, shall prevent the husbandman from bringing his goods to the best market, by exportation or otherwise, it is impossible that his art can flourish. In former times, nations were afraid to permit the exportation of grain, even in seasons of plenty, lest they should be left without food, not considering that the surest mode of producing abundance of any commodity consists in offering, at all times, a good price for it. This error is now rectified in most nations; and at all events, in the present state of affairs, the British husbandman has no reason to complain, as the grain reared in this country is, even in the best seasons, understood to be inadequate to afford subsistence to its inhabitants.

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PRACTICE OF AGRICULTURE.

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Division of
the subject.

THE practice of agriculture naturally divides itself into three parts; 1st, The cultivation of vegetable food for men and animals; 2dly, The cultivation of vegetables, such as flax and hemp, which are more properly articles of commerce; and 3dly, The

rearing and management of animals. To these we shall add, as connected with all the branches of agriculture, a short description of the most useful modes of fencing and enclosing lands for cattle and other objects of husbandry.

PART I. OF THE CULTIVATION OF VEGETABLE FOOD.

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Cultivation
of vegetables
divided
into four
branches.

WE shall consider this branch of the subject under four divisions. In the first we shall present to the reader a statement of the most useful instruments of agriculture: 2dly, We shall state the mode of preparing land for cropping, by removing the physical obstructions to agriculture, and reducing the soil into a proper state; 3dly, We shall explain the culture of particular plants, and the practices of husbandry connected with it; and, lastly, We shall state the principles and operations of the horsehoeing, or drill husbandry.

SECT. I. *Instruments of Husbandry.*

THE instruments employed in agriculture are various; as the plough, the harrow, the roller, &c. which are again diversified by various constructions adapted to particular uses.

I. OF PLOUGHS.

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The plough.

The plough, is a machine for turning up the soil by the action of cattle, contrived to save the time, labour, and expence, which, without this instrument, must have been employed in digging the ground, and fitting it for receiving all sorts of seed.

Amidst all the varieties which can occur in the manner of ploughing the ground, arising from difference of soil, local habits, and other causes, there is still a sameness in the task which gives a certain uniformity to the chief parts of the instrument, and should therefore furnish principles for its construction. There is not, perhaps, any invention of man that more highly merits our utmost endeavours to bring it to perfection; but it has been too much neglected by those persons who study

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An instrument
of the
greatest
value.

machines, and has been considered as a rude tool, unworthy of their attention. Any thing appears to them sufficient for the clumsy task of turning up the ground; and they cannot imagine that there can be any nicety in a business which is successfully performed by the ignorant peasant. Others acknowledge the value of the machine, and the difficulty of the subject; but they think that difficulty insuperable, because the operation is so complicated, and the resistances to be overcome so uncertain, or so little understood, that we cannot discover any unequivocal principle, and must look for improvement only from experience or chance.

But these opinions are ill founded. The difficulty is indeed great, and it is neither from the ignorant farmer nor the rude artist that we can expect improvement. It requires the serious consideration of the most accomplished mechanician; but from him we may expect improvement. We have many data: we know pretty distinctly what preparation will fit the ground for being the proper receptacle for the seed, and for supporting and nourishing the plants; and though it is, perhaps, impossible to bring it into this state by the operation of any instrument of the plough kind, we know that some ploughs prodigiously excel others in reducing the stiff ground to that uniform crumbling state in which it can be left by the spade. The imperfections of their performance, or what yet remains to be done to bring the ground into this state, is distinctly understood. It seems, then, a determinate problem (to use the language of mathematicians), because the operation depends on the invariable laws of mechanical nature.

It will therefore be very proper under this article, to ascertain, if possible, what a plough in general ought to perform.

Instruments to be, by describing distinctly its task. This will surely point out a general form, the chief features of which must be found under every variety that can arise from particular circumstances.

of Husbandry.

The plough performs its task, not by digging, but by being pulled along. We do not aim at immediately reducing the ground to that friable and uniform state into which we can bring it by the spade; but we wish to bring it into such a state that the ordinary operations of the season will complete the task.

For this purpose, a slice or sod must be cut off from the firm land. This must be shoved to one side, that the plough and the ploughman may proceed in their labour; and the sod must be turned over, so that the grass and stubble may be buried and rot, and that fresh soil may be brought to the surface; and all must be left in such a loose and open condition, that it may quickly crumble down by the influence of the weather, without baking into lumps, or retaining water. The first office is performed by the coulter, which makes a perpendicular cut in the ground. The point of the sock follows this, and its edge gets under the sod, and lifts it up. While lifting it up, it also heels it over, away from the firm land. The mouldboard comes last, and pushes it aside, and gradually turns it over as far as is required.

Plate VI.
122
General form of the plough.

The general form of the body of a plough is that of a wedge, or very blunt chisel, *AFEDBC*, (fig. 1.), having the lower corner *D* of its edge considerably more advanced than the upper corner *B*; the edge *BD* and the whole back *AFDB* is the same perpendicular plane; the bottom *FDB* approaches to a triangular form, acute at *D*, and square at *F*; the surface *BCED* is of a complicated shape, generally hollow, because the angle *ABC* is always greater than *FDE*: this consequence will be easily seen by the mathematician. The back is usually called the *LAND SIDE* by the ploughmen, and the base *FDE* is called the *SOLE*, and *FE* the *HEEL*, and *BCED* the *MOULDBOARD*. Lastly, The angle *AFE* is generally square, or a right angle, so that the sole has level both as to length and breadth.

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Advantages of this form.

By comparing this form with attention, the reader will perceive that if this wedge is pulled or pushed along in the direction *FD*, keeping the edge *BD* always in the perpendicular cut which has been previously made by the coulter, the point *D* will both raise the earth and shove it to one side and twist it over; and, when the point has advanced from *F* to *D*, the sod, which formerly rested on the triangle *DFE*, will be forced up along the surface *BCED*, the line *DF* rising into the position *Df*, and the line *EF* into the position *Ef*.—Had the bottom of this furrow been covered with a bit of cloth, this cloth would be lying on the mouldboard, in the position *DfE*: the slice, thus deranged from its former situation, will have a shape something like that represented in fig. 2.

In as much as the wedge raises the earth, the earth presses down the wedge; and as the wedge pushes the earth to the right hand, the earth presses the wedge to the left; and in this manner the plough is strongly pressed, both to the bottom of the furrow by its sole, and also to the firm land by its back or land side. In short, it is strongly squeezed into the angle formed along the line *FD* (fig. 1.) by the perpendicular plane

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abDF and the horizontal plane *FDE*; and in this manner the furrow becomes a firm groove, directing the motion of the plough, and giving it a resisting support, by which it can perform all parts of its task.

Instruments of Husbandry.

We beg our readers to keep this circumstance constantly in mind. It evidently suggests a fundamental maxim in the construction, namely, to make the land side of the plough an exact plane, and to make the sole, if not plane, at least straight from point to heel. Any projection would tear up the supporting planes, destroy the directing groove, and expend force in doing a mischief.

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A fundamental maxim in the construction of a plough.

This wedge is seldom made of one piece. To give it the necessary width for removing the earth would require a huge block of timber. It is therefore usually framed of several pieces, which we shall only mention in order to have the language of the art. Fig. 3. represents the land side of a plough, such as are made by James Small at Rosebank, near Forth, Mid Lothian. The base of it, *CM*, is a piece of hard wood, pointed before at *C* to receive a hollow shoeing of iron *CO*, called the *SOCK*, and tapering a little towards the hinder end, *M*, called the *HEEL*. This piece is called the *HEAD* of the plough. Into its fore part, just behind the sock, is mortised a sloping post, *AL*, called the *SHEATH*, the front of which is worked sharp, forming the edge of the wedge. Nearer the heel there is mortised another piece, *PQ*, sloping far back, called the *STILT*, serving for a handle to the ploughman.

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The several parts of the plough.

The upper end of the sheath is mortised into the long *BEAM RH*, which projects forward, almost horizontally, and is mortised behind into the stilt. To the fore end of the beam are the cattle attached. The whole of this side of the wedge is fashioned into one plain surface, and the intervals between the pieces are filled up with boards, and commonly covered with iron plates. The *COULTER*, *WFE*, is firmly fixed by its shank, *W*, into the beam, rakes forward at an angle of 45° with the horizon, and has its point *E* about six inches before the point of the sock. It is brought into the same vertical plane with the land side of the plough, by giving it a knee outward immediately below the beam, and then kneeling it again downward. It is further supported on this side by an iron stay *FH*, which turns on a pin at *F*, passes through an eye-bolt *I* on the side of the beam, and has a nut screwed on it immediately above. When screwed to its proper slope, it is firmly wedged behind and before the shank.—Fig. 3. N^o 2. represents the same plough viewed from above. *ST* is the right hand or small stilt fixed to the inside of the mouldboard *LV*.

Fig. 4. represents the bottom of the wedge. *CM* is the head, covered at the point by the sock. Just behind the sock there is mortised into the side of the head a smaller piece *DE*, called the *wrest*, making an angle of 16° with the land side of the head, and its outside edge is in the same straight line with the side of the sock. From the point to the heel of the head is about 33 inches, and the extreme breadth of the heel is about nine. The side of the wedge, called the *furrow side*, is formed by the mouldboard, which is either made of a block or plank of wood, or of a thick iron plate.

The sock drawn in this figure is called a *SPEAR SOCK*, and is chiefly used in coarse or stony ground, which

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Socks.

T t

Instruments
of
Husbandry.

which requires great force to break it up. Another form of the sock is represented in the next figure 4. N^o 2. This is called a FEATHER SOCK, and has a cutting edge CF on its furrow side, extending back about ten inches, and to the right hand or furrow side about six. The use of this is to cut the sod below, and detach it from the ground, as the coulter detaches it from the unploughed land. This is of great use when the ground is bound together by knotted roots, but it is evident that it cannot be used to advantage in very stony ground. In general, the feather sock is only fit for ground which has been under tolerable culture; but it greatly facilitates the labour of separating the sod. It may reasonably be asked, why the feather is not much broader, so as to cut the whole breadth of the furrow? This is sometimes done. But we must recollect that the sod is not only to be pushed aside, but also to be turned over. If it were completely detached by the feather, and chanced at any time to break on the back of the sock, it would only be pushed aside; but by leaving a little of the sod uncut, it is held fast below while it is shoved aside above, which cannot fail to twist it round. As the wrest advances, it easily destroys the remaining connection, which in general is very slight and crumbling.

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Proper
breadth of
the sole.

The breadth of the sole at the heel determines the width of the furrow. Nine inches will give enough of room for a horse or man to walk in. A greater breadth is of no use, and it expends force in pushing the earth aside. It is a mistake to suppose that a broad sole gives more room for the turned slice to stand on; for whatever is the breadth of the furrow, the successive slices will be left at their former distances, because each is shoved aside at the same distance. When the breadth of a slice exceeds its depth, and it is turned on its side, it will now stand on a narrow base, but higher than before, and therefore will stand looser, which the farmers desire. But in this case it generally falls on its back before it has been far enough removed, and is then pushed aside, and left with the grassy side down, which is not approved of. On the other hand, when the depth considerably exceeds the breadth, the sods, now turned on their sides, must be squeezed home to the ploughed land, which breaks them and tosses them up, making rough work. In wet clay soil, this is also apt to knead them together. On the whole, it is best to have the breadth and depth nearly equal. But all this is workmanship, and has no dependence on the width of the sole behind.

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It should
be level.

We have already said that the sole is generally level from right to left at the heel. This was not the case formerly, but the wrest was considerably raised behind. It resulted from this form, that the furrow was always shallower on the right side, or there was left a low ridge of unfirred earth between the furrows. This circumstance alone was a bad practice; for one great aim of ploughing is the renewal of the superficial soil. In this way of ribbing the furrows, the sod tumbles over as soon as it is pushed to the top of the rib on the right of the *rus* made by the plough; the firmest parts of it

fall undermost, and the rest crumbles above it, making the work appear neat; whereas it is extremely unequal, and what most needs the influence of the weather to crumble it down is sheltered from it. Add to these circumstances, that the hollow is a receptacle for water, with a surface which can retain it, having been consolidated by the pressure of the plough. For all these reasons, therefore, it seems advisable to form the furrow with a flat or level bottom, and therefore to keep the heel of the wrest as low as the heel of the head. For the same reason it is proper to hold the plough with the land side perpendicular, and not to heel it over to that side, as is frequently done, producing the same ribbed furrow as an ill formed sole.

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There is great variety of opinions about the length of the plough. If considered merely as a pointed instrument, or even as a cutting instrument acting obliquely on a given length of sod, there can be no doubt but that it will be more powerful as it is longer: that is, it will require less force to pull it through the ground. But it must also shove the earth aside, and if we double its length we cause it to act on twice as much earth at once; for when the plough has entered as far as the heel, the whole furrow side is acting together in pushing the earth to the side. Now it is found, that the force necessary for pushing a mass of earth horizontally along the rough ground is nearly equal to its weight. It would seem, therefore, that nothing is to be gained by making the base of the plough of a great length, except a greater facility in making the first penetration, and this is chiefly performed by the coulter and sock; and a great length renders the plough heavy and cumbersome; and, by causing it to act long on the sod, tends to knead and cake it.

Nothing very precise can be offered on this subject. Some sensible advantage is derived by making the plough taper, especially forward, where it acts as a boring and cutting instrument; and for this purpose it is convenient to give the coulter a slope of 45 degrees. (This has also the advantage of throwing up the stones and roots, which it would otherwise drive before it through the firm ground.) And for the same reason the edge of the feather has a great slope, it being 10 inches long and only six inches broad. But if we pursue this advantage too far, we expose ourselves to another risk. It is sometimes necessary to heel over the plough to the right in order to get over some obstruction. In doing this, the coulter is necessarily raised for a moment, and the slanting cut now made by the feather becomes the directing groove for the plough. When the feather has a very long slope, this groove has force enough to guide the whole plough; and it is almost impossible for the ploughman to prevent it from running out of the ground to the land side (A). The feather, therefore, should not exceed ten or twelve inches in length.

But to return to the length of the plough, from which this observation has diverted us a little, we must add, that a long plough has a great advantage in the steadiness of its motion, having a much more extensive support

(A) This is often felt with the excellent plough described by Mr Arbuthnot of Surry, in the Transactions of the Society for the Encouragement of Arts, &c. London.

Instruments of Husbandry. support both on the land side and below, and being therefore less affected by its inequalities. Accordingly they are now made considerably longer than formerly; and 33 inches has been assumed as a proportion to 9 inches of breadth, in conformity to the most approved ploughs now in use.

¹³¹ The mould-board. We come now to treat of the mouldboard. This is the most delicate part of the plough, and is to be seen in the greatest variety in the works of different artists, each of whom has a nostrum of great value in his own opinion. It is here indeed that the chief resistances are exerted and must be overcome; and a judicious form of this part of the plough may diminish them considerably, while it performs the work in the best manner. Without pretending to say that the different resistances are susceptible of an accurate determination, we can still draw sufficient information from palpable rules of mechanics to direct us to what would be nearly the best possible form for a mouldboard. The task to be performed is to raise, push aside, and turn over to a certain degree, a slice already cut off from the firm ground. As we cannot provide for every inequality of the cohesion or tenacity of the earth, our safest way is to consider it as uniform: the weight of it is always so. As we cannot provide for every proportion between the tenacity and the weight, we must take an average or medium proportion which is not far from that of equality. Conceiving the slice at first as only tenacious, and without weight, it is an easy problem to determine the form which shall give it the intended twist and removal with the smallest force. In like manner we can proceed with a slice that has weight without tenacity. It is equally easy to combine both in any proportion; and it is easiest of all to make this combination on the supposition of equality of weight and cohesion. Supposing the slice like a brick, we know that it requires the greatest force to begin to raise it on one edge, and that the strain becomes less as it rises, till its centre of gravity is perpendicularly above the supporting angle. It requires no force to raise it further; for on pushing it beyond this position, it would fall over of itself, unless withheld by the tenacity of what is not yet raised. But on considering the form or plan of the sock, we find that while the weight of the sod resists most strongly, there is less of it in this situation actually rising, and this nearly in the same proportion with the labour of raising it; and we see that after the sod has attained that position in which it is ready to fall over, it has reached the wider part of the wrest, and is now pushed aside, which requires nearly the same force as to raise it: and this continues to the end of the operation.

When we take all these circumstances into consideration, it appears probable, that the compound resistance does not change much from first to last. If this be really the case, it is an undoubted maxim that the whole operation should proceed equably: if it does not, there must be some part of the sod that makes a resistance greater than the medium; and as the resistances in all this class of motions increase nearly as the squares of the velocities with which they are overcome, it is demonstrable that we shall lose power if we render them unequal.

¹³² How to be formed. Hence we deduce this maxim, *That as the plough advances through equal spaces, the twist and the lateral sliding of the sod should increase by equal degrees.* And

this determines *à priori* the form of the mouldboard. This principle occurred to Mr James Small, a ploughmaker in Berwickshire, and he published a treatise on the subject in 1784. He has given several methods for constructing mouldboards, which he supposes are in conformity to his principle; but being merely a country artist, and unacquainted with science, his rules do not produce mouldboards having this property of equable operation, although they do not deviate far from it. His book is a very useful and instructive performance, and level to the capacity of those for whom it is intended; and we have here availed ourselves of the author's information on many points.

The high character which Small's ploughs have maintained for 25 years is a strong argument for the truth of the maxim. We shall therefore give such instructions as will enable any intelligent workman to construct such a mouldboard without any risk of failure; and if future theory or experience should discover any error in the principles from which this maxim is deduced, by showing that either the weight, the tenacity, or the lateral resistance, is exerted according to a different law from what has been assumed, the directions to be given are of such a nature that they adapt themselves with precision to these changes of principle, and will still produce a perfect and efficacious plough. Our readers will readily acknowledge that this is gaining a great point; because at present the instrument is constructed very much at random, and by a guess of the eye.

Let us now return to the wedge formerly made use of for illustrating the action of the plough. Suppose it placed in a furrow already ploughed, and that the space before the line FE (fig. 1.), which is square from the line of motion FD, is covered with a piece of cloth or carpet, and that the point of the wedge enters upon it at F, and advances to D. It will evidently raise the cloth, which will now cover the side of the wedge, forming the triangle *f*DE. The line *f*D is what formerly lay in the angle along the line FD, and *f*E formerly lay on FE. It is this line FE therefore that we are to raise, shove aside, and twist round, by equal degrees, while the plough advances through equal spaces.

Now, if the length DF of the plough-wedge, reckoned from the point of the sock to the heel, be 33 inches, and the breadth FE behind be 9 inches, the angle DEF or DE*f* will be nearly 74°. The construction of the furrow side of the plough is therefore reduced to this very simple problem, "To make the angle DE*f* turn equably round the axis DE, while the angular point L advances equably from D to E.

¹³³ Description of an instrument for this purpose. This will be done by means of the following very simple tool or instrument. Let IHFK (fig. 5.) be a piece of hard wood, such as oak, a foot long, three inches broad, and an inch thick. Plant on this another piece BHFC of the same breadth, four inches long, and half an inch thick. This will leave beyond it a flat 8 inches long. We shall call this the *stock* of the instrument. Let ABC be a piece of clean oak half an inch thick, 20 inches long, and three inches broad at the end BC. Let this be fashioned like the style of a sundial, having its angle ABC 74°. Let it have a part BCE square, to the extent of four inches from C, and the rest EA worked into the form of a straight slender rod:

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Let EFG be a semicircle of clean plane tree or of metal four inches radius: fasten this by small screws to the square part of the stile CE, so that its centre may be at C. Let this semicircle be divided into 180 degrees, and numbered from G along the arch GFE, so that 0° may be at G, and 180° at E. Let this stile and semicircle turn round the line BC by means of small hinges. This instrument may be called the mouldboard gage, or protractor. When the stile is folded down on the stock BIK, the point G will be at F; and when it is raised up to any angle, the degrees will be pointed out on the semicircle by the straight edge CF.

Nothing can be more obvious than the manner of employing this instrument once we have determined the most proper position for the sod when the work is completed. Now it seems to be the opinion of the most intelligent farmers, that the best position of the sod is that represented in fig. 6.

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Proper position of the sod.

Fig. 6. represents a section of the ground and the working parts of the plough, as viewed by a person standing straight before it. ABDC is the unploughed ground, and WB the coulter, kneed in Small's manner. FGKB is the section of the plough (or rather of the whole space through which the plough has passed, for no part of the plough has this section). HOFE is the section of a slice, pushed aside and turned over, so as to lean on the next. HE is that side of the slice which formerly lay on KB. EF is the side cut off by the coulter; and FO is the upper or grassy side. The lower corners are supposed to be a little bruised inwards, as must generally happen.

The sod is pushed 9 inches to the right hand, and it leans with its grassy side on the preceding furrow, in an angle of about 50 degrees. In this position the grass is turned down so as to rot; and there is a hollow left below to allow the rain water to run freely off, and to receive the earth as it crumbles down by the weather: and if the harrow is dragged across these ridges, it distributes along the surface the mould which was formerly at the bottom. The sod has got a twist of 130 degrees: but it is evident, that after it has been turned 90 degrees, or even a little before this, it is ready to fall over of itself. It is sufficient therefore that it be turned 90 degrees when the heel of the wrest has reached it, and the remainder of the twist is given to it by the wing or flap of the mouldboard. This, then, dictates to us the manner of applying the instrument.

Divide the edge DE (fig. 7.) of the wrest, or of a lath nailed on it, into 90 equal parts, and continue the divisions backwards to G in the same line to 130. Number the divisions backwards from the point of the sock; then place the protractor on the edge of the wrest, with the point B of fig. 5. at the 90th division (fig. 7.); that is, just at the heel, with the stock under the wrest, and the stile raised to 90°, and press it home to the joint, so that the stock may be square to the edge, and then the stile will be in the position suiting that part of the mouldboard. In like manner slide the stock forward to the 80th division, and lower the stile to 80°, and it will have the position which suits that part of the mouldboard. In the same way slide it forward to 70, 60, 50, &c. and lower the stile to 70°, 60°, 50°, &c. and we shall have the position for these several parts of the mouldboard; and thus it may be formed to the very

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How to form the mouldboard.

point of the sock, because the straight edge of the wrest may be continued so far. A block of wood may be hewed to fit these several positions of the protractor stile; and thus, when placed with its straight edge on the outer line of the wrest, and cut away behind in the land-side plane, will be the exact shape of the plough-wedge. It would rise up indeed into a tall piece of singular shape, gradually tapering down to the point of the sock; but when cut off parallel to the ground, at the height of about 12 inches, it will form the mouldboard, the front or edge of the sheath, and the whole back of the sock except the feather, which is an extraneous piece. The wing or flap of the mouldboard is formed in the same manner, by sliding the stock of the protractor to 100, 110, 120, 130, and opening the stile to 100°, 110°, 120°, 130°. This will extend the top of the mouldboard to about 22 or 23 inches; but the lower part of the wing must be cut away, because it would push the sod too far aside after it has got the proper twist. The form of this part should be such as would exactly apply itself to a plank set at the heel of the wrest, parallel to the land-side of the head, and leaning outward 40 degrees. This will be very nearly the case, if it be made a sweep similar to the edge of the sheath. Fig. 8. is a resemblance of the surface of the mouldboard; AD being the edge of the sheath, E the heel of the wrest, and EBC the wing or flap. When cut through in a perpendicular direction, the section is hollow; if cut horizontally it is convex; and if in the direction CE, making an angle of 74° with ED, it is straight. If the protractor be set on it at D, and gradually slidden backwards, the mouldboard will gradually open the stile, and the stile will skim its whole surface without any vacuity between them.

This form is given to the mouldboard on the authority of the supposition that the sum of the resistances arising from weight and tenacity remains pretty constant in its whole length. This cannot be affirmed with confidence in any case, and is by no means true in all. In stiff clay soils the effects of tenacity prevail, and in light or crumbling soils the weight is the chief resistance. The advantage of this mode of construction is, that it can be adapted to any soil. If the difficulty of cutting and raising the sod is much greater than that of shoving it aside and turning it over, we have only to make the rise and twist more gentle towards the point of the sock, and more rapid as we advance; and it is easy to do this according to any law of acceleration that we please. Thus, instead of dividing the edge of the wrest DE (fig. 9.) continued to G into 130 parts, draw a line Gg perpendicular to it, and draw some curve line Dg convex towards DG, and divide this into equal parts in the points 10, 20, 30, 40, &c.; and then draw perpendiculars to the wrest edge, cutting it in 10, 20, 30, 40, &c. and apply the protractor to these points. It is evident that the divisions of the wrest line are bigger at D, and grow gradually less towards G; and therefore, because each has 10° more twist than the preceding, the twist will be more rapid as it approaches the end of the mouldboard. This curve may be chosen so as to produce any law of acceleration. On the contrary, we produce a retarded or diminished twist by making the curve concave towards DG, as represented by the dotted curve.

The mathematical reader will observe, that this construction

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struction aims at regulating the twist round the line of the wrest ED. This does not produce precisely the same regulation round the line FD, which is the line of the plough's motion, and of the sod's position before it is ploughed over. The difference, however, is not worth attending to in a matter so little susceptible of precision. But the twist round the line FD may be regulated according to any law by this instrument with equal facility. Instead of placing the stock of the protractor square with the edge of the wrest, it may be placed square with the land side of the plough. To do this, draw a line BL (fig. 5. N^o 2.) across the stock from the point B, making the angle LBC 16°, and put a brass pin at L, making a hole in the stile that it may not be prevented from the folding down. Then, in using the instrument, let the points B and L rest against the edge of the wrest, and proceed as directed.

A still greater variety of forms, and accommodation to particular views, with the same general dependence on principle, will be procured by giving the rod BA a motion round B in the plane of the stile, so as to form a stile of a variable angle.

A tool may even be constructed in which the rod BA might be a cutting knife: and the whole may be led along by a screw, while this knife turns round according to any law, and would gradually pare away the mouldboard to the proper form.

Thus have we reduced the fashioning the operative part of the plough to a rule which is certain. We do not mean by this, that a mouldboard made according to the maxim now given will make the best possible plough; but we have given a rule by which this part of the plough can be made unequivocally of a certain quality by every workman, whatever this quality may be, and this without being obliged to copy. No description of any curve mouldboard to be met with in books has this advantage; and we say that this rule is capable of any systematic variation, either with respect to the width of furrow, or the quantity or variation of its twist. We have therefore put it in the power of any intelligent person to make such gradual and progressive changes as may serve to bring this most useful of all instruments to perfection. The angle of the head and wrest, and the curve for dividing the wrest-line, can always be expressed in writing, and the improvements communicated to the public at large.

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Mode of the plough's action.

After this description of the working parts of a plough, and directions for giving it the most effective form, it will not be improper to consider a little its mode of action, with the view of attaining a more distinct conception of what is done by the ploughman and the cattle, and to direct him in his procedure.

Returning again to the wedge (fig. 1.), we see that it is pressed down at the point D, and as far back along the mouldboard as its surface continues to look upward, that is, all the way to the heel of the wrest. Behind this, the perpendicular sections of the mouldboard overhang, and look downward; and here, while pressing down the sod, the plough is pressed upwards. These two pressures tend to twist the plough round a transverse line somewhere between the heel and the point. The plough therefore tends to rise at the heel, and to run its point deeper into the ground. Upon the whole, the pressure downwards is much greater than the upward

pressure. It is exerted over a much greater space, and is greater in most parts of that space. Behind, very little downward pressure is necessary, the sod being ready to fall down of itself, and only requiring a gentle touch to lay it in a proper position.

In like manner the plough is pressed backward by the resistance made to the coulter and sock, and part of the resistance made to the sloping side of the mouldboard: and it is pressed to the left by the other part of the pressure on the sock and mouldboard.

All these pressures must be balanced by the joint action of the cattle, the resistance of the bottom, and the resistance of the firm ground on the left hand or land-side.

It is the action of the cattle, exerted on that point to which they are attached, which produces all these pressures. It is demonstrated by the principles of mechanics, that this force must not only be equal to the mean or compound force of these resisting pressures, but must also be in the opposite direction.

It is further demonstrated, that if a body be dragged through any resisting substance by a force acting on any point G, and in any direction whatever GH, and really moves uniformly in that direction, the force exerted exactly balances the resistances which it excites, both as to quantity and direction: And if the body advances without turning round the point by which it is dragged, the resistances on one side of this point are in equilibrium with those on the opposite side.

And, lastly, it is demonstrated, that when this equilibrium is obtained, it is indifferent to what point in the line GH the force is applied. Therefore, in fig. 3. N^o 1. the force acting in the direction HO may either be applied to the point of the beam H, or to the point N of the coulter, or to the point O of the sock.

When therefore a plough advances steadily, requiring no effort of the ploughman to direct it, if the line of draught OM (fig. 10.) be produced backwards to the point G of the mouldboard, that point is the place round which all the resistances balance each other. This point may be called the *centre of resistance* and the *centre of action*.

It would be of importance to determine this point by principle; but this can hardly be done with precision even in a plough of a known form: and it is impossible to do it in general for all ploughs, because it is different in each. It even varies in any plough by every variation of the proportion between the weight and the cohesion of the sod. We see how it can be found experimentally in any given uniform sod, viz. by producing backwards the line of draught. Then, if the draught rope, instead of being fixed to the muzzle of the beam, were fixed to this point, and if it were pulled in the same direction, the plough would continue to perform its work without any assistance from the ploughman, while the sod continued uniform. But the smallest inequality of sod would derange the plough so as to make it go entirely out of its path. Should the resistances between G and D prevail, the plough would go deeper, which would increase the resistances on that side where they already exceed, and the plough would run still deeper. Should the resistances behind G prevail, the heel would be pressed down, and the point would rise, which would still farther destroy the equilibrium, and, producing a greater deviation from the

Instruments of Husbandry. the right path, would quickly throw the plough out of the ground.

For these reasons we must not think of attaching the draught to the centre of resistance; but must contrive a point of draught, such as shall restore the plough to its proper position when it has been driven out of it by any obstruction.

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Muzzle of the beam.

The muzzle or end of the beam is a point which will completely suit our purpose. For suppose that the resistance on the back of the sock has prevailed, and the plough MNFD (fig. 10.) has taken the position *mnfd* represented by the dotted lines, the draught line GMO is brought down into the position *gmo*, diverging a little from GMO, and meeting the mouldboard in a point *g* considerably before G. By this means the resistances on the hinder side of *g* are increased, and those before it are diminished, and the plough quickly regains its former position.

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The point of draught.

From these observations it is plain, that whatever is the situation of the centre of resistance, the point of draught may be so chosen that the action of the cattle shall be directly opposed to the resistance of the ground, and that moreover the plough shall have no tendency either to go deeper or to run out. This is the use of the apparatus at the point of the beam called the muzzle, represented at H (fig. 3.) It turns round a bolt *i* through the beam, and can be stopped at any height by another pin *k* put through the holes in the arch *lm*. A figure is given of the muzzle immediately below, as it appears when looking down on it. The eye to which the draught rope is hooked is spread out horizontally, as shown by HK, and has several notches O in it, to either of which the hook can be applied. This serves to counteract any occasional tendency which the plough may have to the right or left.

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Of the plough in trim.

When the plough goes on steadily, without any effort of the ploughman, it is said to be in trim, and to swim fair; the pressure before and behind the centre of action being in equilibrio with each other. In order to learn whether a plough will be in this manner under management, hook the draught rope as high as possible. In this state the plough should have a continual tendency to rise at the heel, and even to run a little into the ground. Then hook the rope as low as possible. The plough should now press hard on the furrow with the heel, and have some tendency to run out of the ground. If both these are observed, the plough is properly constructed in this respect; if not, it must be altered, either by changing the position of the sock or that of the beam. Lowering the end of the beam will correct the tendency of the plough to go deeper; the raising the point of the sock will also have the same effect. But it is of considerable importance not to take the point of the sock out of the plane of the sod, and it is much better to make the alteration by the beam. The slope of the coulter has a considerable effect, but it cannot be placed very far from the inclination of 45° without the risk of choking the plough by driving the roots and stones before it. It is of great consequence to have the coulter sit exactly in the direction of the plough's motion: if it is in any other direction, it will powerfully twist the plough into its own track. As it must be fixed in the middle of the beam's thickness to have strength, it is removed a little from the plane of the land side, and it was the usual practice to point

it to the left below to compensate for this; but this by no means removes the disposition to twist, and it exposes to the risk of catching a stone between its point and that of the sock, which must now be driven forward through the firm ground at a great expence of labour to the cattle. Mr Small has very ingeniously remedied this by giving the coulter a short knee to the left immediately below the beam, and thus pointing it downwards in the plumb of the land side. See fig. 6.

It is not without its use to know the absolute force necessary for tilling the ground. This has been frequently measured with a spring steelyard. One of Small's ploughs, worked by two horses, and employed in breaking up stiff land which had been ploughed before winter, and much consolidated by the rains, required a force of 360lbs. avoirdupois; and we may state this as the ordinary rate of such work; but moderately firm sod, under good culture, requires at a medium 320lbs.

As we wish to embrace every opportunity of rendering this work useful to the public, we shall conclude this article with an account of a plough which has just now been recommended to public notice by the Scots Highland Society as extremely proper for a hilly country. The inventor, the Rev. Alexander Campbell minister at Kilcalmonell in Argyleshire, was honoured with the society's gold medal, value 25l.

A, the sock (fig. 11.); the land-side of which sup-¹⁴⁰plies the place of the coulter, and the sole of it serves The Ar-^{gyleshire} for a feather; it is 18 inches long, and is made of a ^{plough} plate of iron 12 inches broad when finished, and somewhat under half an inch thick.—B, the head; to be made of iron in a triangular form, 4 inches broad by 2 inches at the thickest part. There are 5 inches of the head fixed in the sock.—C, the beam, 4 inches thick by 5 inches deep, gradually tapered thinner; the length 6 feet.—E, the sheath, must be of the same thickness with the beam above and the head below, and is five inches broad. An iron screw-bolt connects the beam and head behind the sheath.—F, the handles are so made that the slope of the mouldboard, which is fixed to one of them, may be the longer and more gradual. They are 5 feet 8 inches long, and 2 feet 4 inches asunder at the ends.—G, the mouldboard, consists of 7 rounded sticks 2 inches in diameter; the covert of them is in the plane of the sole, the rest in succession close to each other above it. This makes the mouldboard 14 inches broad. To prevent any earth from getting over the mouldboard, a thin dale 4 or 5 inches broad is fixed above it. The mouldboard, land-side, and sole of the plough, are clad with iron.—The length is 20 inches: this added to 18 inches, the length of the sock, makes the length from point to heel 3 feet 2 inches.—The muzzle or bridle OPH is also of a more convenient and better construction than those commonly in use. By means of the screw pins at L and M different degrees of land may be given to the plough; the iron rod LH being thereby moved sidewise in the socket LN, and up and down by OP. The rod is 30 inches long, one broad, and half an inch thick. It is hooked into a screwbolt at H. Two inches of the rod project at N, in the form of an eye, before the muzzle, to receive the hook of the crofstree.

The advantages of this plough are said to be: It is not so liable to be interrupted or turned out of its course by

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by stones, roots, &c. as other ploughs are; nor does it dip so deep as to be liable to be broken by large stones or flags. The motion of the muzzle is also thought an improvement. Another advantage it has over other ploughs is, its not being so liable to be choaked up by stubble, &c. This we understand to be its chief excellency, and an object much desired in the construction of the plough. Upon the whole, we are informed that this plough is lighter, less expensive, and less liable to go out of trim than the ordinary plough, and that with it two horses can plough land which require four with any other plough.

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Objections
to its con-
struction.

Such are said to be the advantages of this construction; but we cannot help expressing our apprehension that the uniting the coulter and feather at the point of the sock will expose the plough to great risks of being put out of order. When the upright edge strikes a stone obliquely, especially on the land-side, it must be violently twisted round the point of the head; and, having but a moderate thickness at this part, may be broken or permanently twisted. The plough will then be continually running out of its direction: and we apprehend that this defect cannot be amended without taking off the sock and putting it in the fire. When a coulter is bent by the same cause, the ploughman can either rectify it by altering the wedging, or he can straighten it in the field; and it must be observed, that the plough opposes much less resistance to the derangement of this sort of coulter than of the common one. In the common coulter the strain does not so much tend to twist the plough round the line of its motion, as to press it wholly to landward. The resistance to this is great; but a very moderate force will twist it round its line of motion. In either case, if the blow be given in that point of the coulter where the draught line crosses it, there will be no twist of the whole plough, but the point of the plough will be forced horizontally to or from the land. When the blow is out of this line, the strain tends to twist the beam or the plough. Experience will determine which of the two is the most hazardous. These ploughs were made by Thomas Lindsay, Abbeyhill, Edinburgh, and models are to be seen in the hall of the Highland Society.

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Scots
plough.

The plough constructed in the following manner is still the most common and the most generally understood in Scotland; and, if properly made, is the best for answering all purposes, when only one is used; though others are, perhaps, more proper on some particular occasions.

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Description
of the Scots
plough.

The parts of which this plough is composed, are, the head, the beam, the sheath, the wrest, the mouldboard, the two handles, the two rungs, the sock, and the coulter; the two last are made of iron, and all the rest of wood.

Plate VII.
fig. 1.

The HEAD is designed for opening the ground below. The length of the head from A to B is about 20 inches, and the breadth from A to D above five inches; C is the point upon which the sock is driven, and the length from B to C is about six inches; *a* is the mortise into which the larger handle is fixed, and *b* is the mortise into which the sheath is fixed.

The head is that part of the plough which goes in the ground; therefore the shorter and narrower it is, the friction will be the less, and the plough more easily drawn; but the longer the head is, the plough goes

more steadily, and is not so easily put out of its direction by any obstructions that occur. Twenty inches is considered as a mean length; and five inches as the most convenient breadth.

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Fig. 2.

The SHEATH, E, is driven into the mortise *b*, and thus fixed to the head A B. It is not perpendicular to the head, but placed obliquely, so as to make the angle formed by the lines A B and E B about 60 degrees. The sheath is about 13 inches long, besides what is driven into the mortise *b* (fig. 1.); about three inches broad, and one inch thick.

The sheath is fixed to the mouldboard, as in fig. 1. Fig. 3. E, in the same manner as the wrest is fixed to the head in fig. 7.

The MOULDBOARD is designed to turn over the earth of the furrow made by the plough; and it is obvious, that, according to the position of the sheath, the mouldboard will turn over the earth of the furrow more or less suddenly. Besides, when it forms a less angle with the head than 60 degrees, the plough is in great danger of being *choked*, as the farmers term it.

The larger HANDLE, F A, is fixed to the head, by driving it into the mortise *a* (fig. 1.) It is placed in the same plane with the head; and its length from A F is about five feet four inches, and its diameter at the place where it is fixed to the beam is about two inches and a half, and tapers a little to the top F. About ten inches from A, there is a curve in the handle, which, when F is raised to its proper height, makes the lower part of it nearly parallel to the sheath E B. This curve is designed to strengthen the handle. The proper position of the handle is, when the top F is about three feet two inches higher than the bottom of the head A B.

The longer the handles, the plough is the more easily managed, because the levers are more distant from the centre of motion. The higher the top of the handles, the plough is more easily raised out of the ground, provided they be no higher than the lower part of a man's breast.

The BEAM, is fixed to the larger handle and the sheath, all of which are placed in the same plane with the head. The length of it, from H to I, is about six feet; its diameter is about four inches. When the plough is in the ground, the beam should be just high enough not to be incommoded by any thing on the surface.

The position of the beam depends on the number of cattle in the plough. When two horses are yoked, the beam should be placed in such a manner as to make the perpendicular distance betwixt the bolt-hole of the beam and the plane of the head about twenty-one inches; when four horses are yoked, two a-breast, this distance should only be about eighteen inches.

The SOCK, B P, is fixed to the end of the head, and is about two feet long. In fitting the sock to the head, the point ought to be turned a little to the land or left side; because otherwise it is apt to come out of the land altogether. When turned to the left, it likewise takes off more land; when turned upwards, the plough goes shallow; and when downwards, it goes deeper.

The COULTER, is fixed to the beam, and is about two feet ten inches long, two inches and a half broad, sharp at the point and before, and thick on the back,

like

Instruments of Husbandry. like a knife. It is fixed and directed by wedges, so as to make the point of it equal to, or rather a little before, the point of the sock, and upon a line with the left side of the head. This oblique position enables it to throw roots, &c. out of the land, which requires less force than cutting or pushing them forward.

Fig. 7. The **WREST**, **BD**, is fixed to the head, and is about 26 inches long, two broad, and one thick. It is fixed to the head at **B**, in such a manner as to make the angle contained between the lines **AB** and **BD** about 25 degrees. The wrest is seldom or never placed in the same plane with the head, but gradually raised from the place where it is fixed to it; that is, from **B** to **K**, as in **fig. 8**. The position of the wrest determines the nature of the furrow. When the wrest is wide and low set, the furrow is wide; and when it is narrow and high set, the furrow is narrow.

Fig. 9. represents the two **HANDLES**, fixed together by the two rungs. The larger handle has already been described; the lesser one is a few inches shorter, and does not require to be quite so strong. The distance of the handles at the little rung depends on the position of the wrest. Their distance at **M** and **P** is about two feet six inches. The lesser handle is fixed to the mouldboard at **M**, **fig. 10.** and to the wrest **KB**, at **L**.

Fig. 11. represents the plough complete, by joining together **figures 6. and 10.** in the sheath **E B**. The wrest **BK** is supposed to make an angle with the head **AB** as in **fig. 7.** and the handles joined together as in **fig. 9.**

After having given such a particular description of all the parts and proportions of the Scots plough, it will easily appear how it separates, raises, and turns over the earth of the furrow. If it had no coulter, the earth would open above the middle of the sock, and in a line before the sheath; but as the coulter opens the earth in a line with the left side of the head, if the soil has any cohesion, the earth of the furrow will be wholly raised from the left side, and, as the sock moves forward, will be thrown on the right side of the sheath, and by the casting out of the mouldboard, or the raising of the wrest, will be turned over.

Fig. 12. The **BRIDLE**, or **MUZZLE**, is another article belonging to the plough. It is fixed to the end of the beam, and the cattle are yoked by it. The muzzle commonly used is a curved piece of iron, fixed to the beam by a bolt through it. **A B C** is the muzzle, **A C** the bolt by which it is fixed to the beam; **D** is the swingle-tree or cross-tree, to which the traces are fixed; and **B** is a hook or *cleek*, as it is commonly called, which joins the muzzle and swingle-tree.

Fig. 13. Some use another kind of muzzle, **A B C D**. It is fixed to the beam by two bolts, and has notches by which the cleek of the swingle-tree may be fixed either to the right or the left of the beam. There are also different holes for the hind bolt to pass through, by which the draught may be fixed either above or below the beam. **A D** is the fore bolt upon which the muzzle turns; on **BC** are four notches, betwixt any two of which the cleek of the swingle-tree may be fixed. When the cleek is fixed at **B**, the plough is turned towards the firm land, and takes off a broader furrow; and when fixed at **C**, it is turned towards the ploughed land, and takes off a narrower furrow. **E** and **F** are the holes on each side through which the hindmost

bolt passes. When the bolt is put through the highest of two, these holes being thereby brought to the middle of the beam, the fore part of the muzzle is raised above the beam, and the plough is made to go deeper, and when put through the lowest two, the fore part of the muzzle is sunk below the beam, and the plough is made to go shallower. This muzzle may be so constructed as to have the same play with the common one. **A** is the end of the beam; **B** a plate of iron sunk into it, and, with a similar one in the other side, is rivetted into it by bolts; **C** is the muzzle fixed to these plates of iron by the bolt **D**, which bolt may be put through any of the holes **EE**. From the construction of this muzzle it is plain, that it has the same play with the common one, and that by it the land of the plough may be altered at pleasure.

Of all forms, that of the Scots plough is the fittest for breaking up stiff and rough land, especially where stones abound; and no less fit for strong clays hardened by drought. The length of its head gives it a firm hold of the ground; its weight prevents it from being thrown out by stones; the length of the handles gives the ploughman great command to direct its motion; and by the length of its head, and of its mouldboard, it lays the furrow-slice cleverly over. This plough was contrived during the infancy of agriculture, and was well contrived: in the soils above described it has not an equal.

But in tender soil it is improper, because it adds greatly to the expence of ploughing, without any counterbalancing benefit. The length of the head and mouldboard increases the friction, and consequently it requires a greater number of oxen or horses than are necessary in a shorter plough. There is another particular in its form that resists the draught: the mouldboard makes an angle with the sock, instead of making a line with it gently curving backward. There is an objection against it no less solid, that it does not stir the ground perfectly: the hinder part of the wrest rises a foot above the sole of the head: and the earth that lies immediately below that hinder part, is left unstirred. This is ribbing land below the surface, similar to what is done by ignorant farmers on the surface.

These defects must be submitted to in a soil that requires a strong heavy plough; but may be avoided in a cultivated soil by a plough differently constructed. Of all the ploughs fitted for a cultivated soil free of stones, that already mentioned, which was introduced into Scotland about 20 years ago, by James Small in Blackadder Mount, Berwickshire, is the best. It is now in great request; and with reason, as it avoids all the defects of the Scots plough. The shortness of its head and of its mouldboard lessen the friction greatly: from the point of the sock to the back part of the head it is only 30 inches; and the whole length, from the point of the beam to the end of the handles, between eight and nine feet. The sock and mouldboard make one line gently curving; and consequently gather no earth. Instead of a wrest, the under edge of the mouldboard is one plain with the sole of the head; which makes a wide furrow, without leaving any part unstirred. It is of late commonly termed the *chain-plough*, because it is drawn by an iron chain fixed to the back part of the beam immediately before the coulter. This has two advantages: first, it means

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Fig. 16.

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Properties of the Scots plough.

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In what soil improper.

146
Chain-plough. Plate VIII. fig. 1.

Instruments of Husbandry. means of a muzzle, it makes the plough go deep or shallow; and, next, it stresses the beam less than if fixed to the point, and therefore a slenderer beam is sufficient.

As we have already sufficiently explained the speculative principles upon which this plough is formed, we shall only remark, that it is proper for loams, for carse clays, and, in general, for every sort of tender soil free of stones. It is even proper for opening up pasture ground, where the soil has been formerly well cultivated.

¹⁴⁷ Of the fock. Plate VII. A spiked fock is used in the Scots plough. The difference between it and the feathered fock will be best understood by comparing their figures. Fig. 14. is the common fock, and fig. 15. the feathered one.

From the construction of the feathered fock, it is obvious, that it must meet with greater resistance than the common fock. However, when the plough takes off the earth of the furrow broader than that part of the fock which goes upon the head, it is more easily drawn than the plough with the common fock; for the earth which the common fock leaves to be opened by the wrest, is more easily opened by the feather of the other fock. In ley, the feathered fock makes the plough go more easily, because the roots of the grass, which go beyond the reach of the plough, are more easily cut by the feather than they can be torn asunder by the common fock. The feathered fock is also of great use in cutting and destroying root weeds. The common fock, however, answers much better in strong land.

It is proper here to add, that in fitting the feathered fock to the head, the point of it should be turned a little from the land, or a little to the right hand.

¹⁴⁸ Ignorance of farmers in Scotland but a few years ago.

If we look back 40 years, ploughs of different constructions did not enter even into a dream. The Scots plough was universally used, and no other was known. There was no less ignorance as to the number of cattle necessary for this plough. In the south of Scotland, six oxen and two horses were universal; and in the north, 10 oxen, sometimes 12. The first attempt to lessen the number of oxen was in Berwickshire. The low part of that county abounds with stone and clay marl, the most substantial of all manures, which had been long used by one or two gentlemen. About 30 years ago it acquired reputation, and spread rapidly. As two horses and two oxen were employed in every marl cart; the farmer, in summer fallowing, and in preparing land for marl, was confined to four oxen and two horses. And as that manure afforded plenty of succulent straw for oxen, the farmer was surprised to find that four oxen did better now than six formerly. Marling, however, a laborious work, proceeded slowly, till people were taught by a noted farmer in that country, what industry can perform by means of power properly applied. It was reckoned a mighty task to marl five or six acres in a year. That gentleman, by having plenty of red clover for his working cattle, accomplished the marling of 50 acres in a summer, and once of 54. Having so much occasion for oxen, he tried with success two oxen and two horses in a plough; and that practice became general in Berwickshire.

Now here appears with lustre the advantage of the chain-plough. The great friction occasioned in the Scots plough by a long head, and by the angle it

makes with the mouldboard, necessarily requires two oxen and two horses, whatever the soil be. The friction is so much less in the chain-plough, that two good horses are found sufficient in every soil that is proper for it. Besides, the reducing the draught to a couple of horses has another advantage, that of rendering a driver unnecessary. This saving on every plough, where two horses and two oxen were formerly used, will, by the strictest computation, be 15l. sterling yearly; and where four horses were used, no less than 20l. sterling. There is now scarce to be seen in the low country of Berwickshire, or in the Lothians, a plough with more than two horses; which undoubtedly in time will become general. We know but of one further improvement, that of using two oxen instead of two horses. That draught has been employed with success in several places; and the saving is so great, that it must force its way everywhere, providing only a breed of oxen with a quick step could be obtained. It may be confidently affirmed, no soil stirred in a proper season, can ever require more than two horses and two oxen in a plough, even the stiffest clay. In all other soils, two good horses, or two good oxen abreast, may be relied on for every operation of the chain-plough.

A chain-plough of a smaller size than ordinary, drawn by a single horse, is of all the most proper for horse-hoeing, supposing the land to be mellow, which it ought to be for that operation. It is sufficient for making furrows to receive the dung, for ploughing the drills after dunging, and for hoeing the crop.

A still smaller plough of the same kind may be recommended for a kitchen garden. It can be reduced to the smallest size, by being made of iron; and where the land is properly dressed for a kitchen garden, an iron plough of the smallest size drawn by a horse will save much spade-work. In Scotland, forty years ago, a kitchen garden was an article of luxury merely, because at that time there could be no cheaper food than oatmeal. At present, the farmer maintains his servants at double expence, as the price of oatmeal is doubled; and yet he has no notion of a kitchen garden more than he had thirty years ago. He never thinks, that living partly on cabbage, kail, turnip, carrot, would save much oatmeal: nor does he ever think, that change of food is more wholesome, than vegetables alone, or oatmeal alone. We need not recommend potatoes, which in scanty crops of corn have proved a great blessing: without them, the labouring poor would frequently have been reduced to a starving condition. Would the farmer but cultivate his kitchen garden with as much industry as he bestows on his potato crop, he needed never fear want; and he can cultivate it with the iron plough at a very small expence. It may be held by a boy of 12 or 13; and would be a proper education for a ploughman. But it is the landlord who ought to give a beginning to the improvement. A very small expence would enclose an acre for a kitchen garden to each of his tenants; and it would excite their industry, to bestow an iron plough on those who do best.

Nor is this the only case where a single horse plough may be profitably employed. It is sufficient for seed-furrowing barley, where the land is light and well-dressed.

Instruments of Husbandry. dressed. It may be used in the second or third ploughing of fallow, to encourage annual weeds, which are destroyed in subsequent ploughings.

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Rotheram
Plough,
Plate IX.
fig. 3.

The *Rotheram plough* is a machine of very simple construction, and easily worked. AB is the beam, CD the sheath, FBD the main handle, FR the smaller handle, GH the coulter, KI the sock or share, NP the bridle, S the fly-band, and ML a piece of wood in place of a head. The whole of this plough should be made of ash or elm; the irons should be steeled and well tempered; and that part of the plough which is under ground in tilling should be covered with plates of iron. The difference between this and the common plough seems to consist in the bridle at the end of the beam, by which the ploughman can give the plough more or less land by notches at N, or make it cut deeper or shallower by the holes at P; in the coulter or share, which are so made and set as to cut off the new furrow without tearing; and in the mouldboard, which is so shaped at first to raise a little, and then gradually turn over, the new cut furrow with very little resistance. But the greatest advantage attending it, is its being so easy of draught, that it will do double the work of any common plough.

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The Paring
Plough,
Plate IX.
fig. 4.

The *paring plough* is an instrument used in several parts of England for paring off the surface of the ground, in order to its being burnt. Mr Bradley has given the following description of a very simple instrument of this kind: From A to A (fig. 15.) is the plough-beam, about seven feet long, mortised and pinned into the block B, which is of clean timber without knots. CC are the sheaths or standards, made flat on the inside, to close equally with the paring plate, and fastened to it with a bolt and key on each side, as at D. E is the paring plate of iron laid with steel, about four inches wide, and from 12 to 18 inches long. This plate must be made to cut on the sides, which are bolted to the standards as well as at the bottom part. FF are two iron braces to keep the standards from giving way: these standards must be mortised near their out-sides and through the block. GG are the plough handles, which must be fixed slopeways between the beam and the standards. The pin holes in the beam, the use of which is to make this plough cut more or less deep, by fixing the wheels nearer to or farther from the paring plate, should not be above two inches asunder.

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The Four-
coultured
Plough,
Plate IX.

Fig. 1. represents the four-coultured plough of Mr Tull. Its beam is ten feet four inches long, whereas that of the common plough is but eight. The beam is straight in the common plough, but in this it is straight only from *a* to *b*, and thence arched; so that the line let down perpendicularly from the corner at *a*, to the even surface on which the plough stands, would be 11 $\frac{1}{2}$ inches; and if another line were let down from the turning of the beam at *b* to the same surface, it would be one foot eight inches and a half; and a third line let down to the surface from the bottom of the beam at that part which bears upon the pillow, will show the beam to be two feet ten inches high in that part. At the distance of three feet two inches from the end of the beam *a*, at the plough-tail, the first coulter, or that next the share, is let through; and at 13 inches from this, a second coulter is let through: a third at the same distance from that; and, finally, the fourth

at the same distance from the third, that is, 13 inches, and from *a* to *b* is seven feet.

The crookedness of the upper part of the beam of this plough is contrived to avoid the too great length of the three foremost coulters, which would be too much if the beam was straight all the way; and they would be apt to bend and be displaced, unless they were very heavy and clumsy. Ash is the best wood to make the beam of, it being sufficiently strong, and yet light. The sheat in this plough is to be seven inches broad. The fixing of the share in this, as well as in the common plough, is the nicest part, and requires the utmost art of the maker; for the well-going of the plough wholly depends upon the placing this. Supposing the axis of the beam, and the left side of the share, to be both horizontal, they must never be set parallel to each other; for if they are, the tail of the share bearing against the trench as much as the point, would cause the point to incline to the right hand, and it would be carried out of the ground into the furrow. If the point of the share should be set so, that its side should make an angle on the right side of the axis of the beam, this inconvenience would be much greater; and if its point should incline much to the left, and make too large an angle on that side with the axis of the beam, the plough would run quite to the left hand; and if the holder, to prevent its running quite out of the ground, turns the upper part of his plough towards the left hand, the pin of the share will rise up, and cut the furrow diagonally, leaving it half unploughed. To avoid this and several other inconveniences, the straight side of the share must make an angle upon the left side of the beam; but that must be so very acute a one, that the tail of the share may only press less against the side of the trench than the point does. This angle is shown by the pricked lines at the bottom of fig. 9. where *ef* is supposed to be the axis of the beam let down to the surface, and *gf* parallel to the left side of the share: and it is the subtense *eg* that determines the inclination which the point of the share must have towards the left hand. This subtense, says Mr Tull, at the fore-end of an eight-feet beam, should never be more than one inch and a half, and whether the beam be long or short, the subtense must be the same.

The great thing to be taken care of, is the placing the four coulters; which must be so set, that the four imaginary places described by their four edges, as the plough moves forward, may be all parallel to each other, or very nearly so; for if any one of them should be very much inclined to, or should recede much from, either of the other, then they would not enter the ground together. In order to place them thus, the beam must be carefully pierced in a proper manner. The second coulter-hole must be two inches and a half more on the right hand than the first, the third must be as much more to the right of the second, and the fourth the same measure to the right hand of the third; and this two inches and a half must be carefully measured from the centre of one hole to the centre of the other. Each of these holes is a mortise of an inch and a quarter wide, and three inches and a half long at the top, and three inches at the bottom. The two opposite sides of this hole are parallel to the top and bottom, but the back is oblique, and determines the obliquity

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Instruments of Husbandry. obliquity of the standing of the coulter, which is wedged tight up to the poll. The coulter is two feet eight inches long before it is worn; the handle takes up sixteen inches of this length, and is allowed thus long, that the coulter may be driven down as the point wears away. As to the wheels, the left hand wheel is 20 inches diameter, and that on the right hand two feet three inches, and the distance at which they are set from each other is two feet $5\frac{1}{2}$ inches.

2. The PATENT SWORD-CUTTER.

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Patent
Sword-
cutter,
Plate IX.

The different parts of this instrument are represented by N^o 1. 2. 3. of fig. 6. AA, &c. a square frame three feet four inches from the fore to the hind part, by four feet three inches, the breadth of the machine within side; the timber (when of fir) four inches square, placed on two wheels BB three feet diameter, a little more or less (the old fore-wheels of a chaise may answer the purpose), to support the hind part of the machine.

CC, &c. are six strong pieces of wood, called *bulls*, three feet long, five inches and a half broad, the thickness six inches at E, and tapering to three inches at F. Into these bulls are fixed the cutting wheels, which are iron, 13 inches diameter, $\frac{3}{4}$ ths of an inch thick at the centre, about an inch diameter, for piercing holes to fix the iron axles in; from that they are to be of such thickness, as allow the edges to be well steed. The wheels are fixed by two bolts going through the bulls, with eyes on one end for the axles of the wheels to run in, and nuts and screws on the other to make them very firm by being sunk in the bulls, to prevent their interfering with the weights LL, &c. resting on them.

GG, &c. are hollow pieces of wood, called *thorles*, each $3\frac{1}{2}$ inches long, which enclose the bolt MM, and keep the bulls CC, &c. at their proper distances, but may be made longer or shorter at pleasure, according as the sward requires to be cut in larger or smaller pieces. They are in two pieces bound together, and jointed by a strap of leather or cord, which allows them to be readily changed when the cutting wheels require to be kept at more or less distance.

The iron bolt MM goes through two pieces of wood or iron PP, seven inches long, clear of the wood, supported by iron stays fixed to the frame, and through all the bulls. It requires to be strong, as the draught of the horses terminates there.

HH, N^o 2. and 3. a cylinder or segment of wood, seven inches diameter, called a *rocking tree*, which goes across the frame, and moves on the pivots fixed into it, one at each end, supported by an iron bolt or piece of wood mortised into the frame, eight inches high, as appears in N^o 2. and 3. to which six chains or ropes are fixed by hooks, at different distances, as you want your cuts, nine, eight, seven, or six inches from one another, and are joined to the end of each bull in which the cutting wheels run; so that when the rocking tree is turned about by the lever I, fixed in the middle of it, all the bulls, with their cutting wheels, are raised out of the ground at once, as in N^o 3. by which means the machine may be turned, or moved from place to place with great ease, without any danger of straining the wheels.

LLL, &c. N^o 1. 2. 3. are weights of freestone,

26 inches long and six inches broad; the under one four inches thick, the upper one three inches thick; weighing about 64lb. the under, and 48 the upper; each of them having two holes, through which iron spikes, firmly fixed in the bulls, pass, in order to keep them steady.

When the ground is easily cut, the under stone may answer; when more difficult, the other stone may be added; so that every wheel may have seven stone weight upon it, which has been found sufficient for the stiffest land and toughest sward the machine has ever been tried on. Cast iron weights will answer fully better, but are more expensive.

The lever I, N^o 2. 3. which ought to be five feet long, must have a sliding rope on it; fixed to the back part of the frame; so that when the cutting wheels are all taken out of the ground three or four inches, by the rocking tree's being turned partly round by the lever, the rope may be fixed to it by a loop over the pin R, N^o 3. (it ought to be placed three feet four inches from the extremity of the lever I.) Thus all the cutting wheels are kept out of the ground till the machine is turned; and then by moving the loop off the pin, it slips back towards the frame, and the lever is gently let back to its place, as in N^o 2. by which the cutting wheels are put into their former posture, by the weights fixed on the bulls in which they run. The levers may be made of good tough ash.

PP, N^o 1. a small bolt of iron, with a hook on one end of it (one is sufficient), to strengthen the bolt MM to be hooked on the centre of it, and joined to the frame by a nut and screw.

The grooves in which the cutting wheels run, may be covered below at the hinder part with a plate of thin black iron, 6 inches long, 3 inches broad, having a slit in it where the wheels run, to prevent (if found necessary) any grass, weeds, or small stones, from filling the grooves, and clogging the wheels.

To the frame N^o 1. are fixed (for a double-horse sward-cutter) three shafts, as in a waggon, of such length, strength, and distance from one another, as any workman may think proper.

For a single-horse sward-cutter (which has only four cutting wheels), a pair of shafts are used, and may make the two sides of the frame without any joinings. The width of the frame, in proportion to the double-horse sward-cutter, is as four to six.

It is recommended for a double-horse sward-cutter to have eight bulls and wheels, in order that when it is used to reduce hard clody summer-fallow, or land for barley, before the last furrow, or even after it, the whole weight (42 stone) employed in cutting the stiffest land and toughest sward, may be applied to the 8 bulls then at 6 inches from one another. The 64lb. weights to be applied to six of the bulls, and two of the 48lb. weights to each of the additional bulls, which is a sufficient weight for the purpose, and will effectually prevent a clod of more than six inches breadth from escaping being broke into pieces.

In the same manner, a single-horse sward-cutter may have six bulls for the above-mentioned purpose; the 28 stone belonging to it divided thus: The 64lb. weights to four of the bulls, and two of the 48lb. weights to each of the additional bulls.

That the machine may come as cheap as possible to
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Instruments
of
Husbandry.

the public, the inventor is of opinion, that the expence of the two wheels and the iron axle (which is considerable) may be saved, by joining strongly to the frame at S, N^o 3. a piece of wood with a little curve at the extremity of it, resembling the foot of a sledge formerly much used in Scotland to carry in the corn from the field; the part of it resting on the ground being kept 18 inches (the half diameter of the wheels) from the frame by a strong support of wood.

As the two outer bulls next the frame are apt to get under it, so as to prevent the cutting wheels from being taken out of the ground, a thin slip of iron fixed to the inside of the frame, nearly opposite to the back end of the bulls, of convenient length, will be found necessary.

The original intention of this machine was to prepare old grass ground for the plough, by cutting it across the ridges, in the beginning of or during winter, when the ground is soft, in order to answer all the purposes that Mr Tull proposed by his four-coulter plough above described, and so strongly recommended by him for bringing into tith grass ground that has been long rested. This the sward-cutter has been found to do much more effectually and expeditiously: For Mr Tull's machine cuts the sward in the same direction with the plough; and is liable, from every obstruction any of the coulters meet with, to be thrown out of its work altogether, or the instrument broken; to which the sward-cutter, consisting of four, six, or more cutting wheels, is never liable, from these being entirely independent of one another, cutting the ground across the ridges before ploughing, and rendering that operation easier to two horses than it would be to three, without its being cut. The furrow being cut across, falls finely from the plough in squares of any size required, not under six inches, in place of long slips of tough sward seldom and imperfectly broke by the four-coultered plough.

This instrument is very fit for preparing ground for burnbating, as it will save much hard labour.

It may be properly used in cross-cutting clover of one or two years standing, to prepare the ground for wheat, if the land is stiff and moist enough.

It may be applied to cutting and cross-cutting pasture ground, intended to have manure of any kind put upon it to meliorate the grass. In this it will far exceed the scarificator mentioned in one of Mr Young's tours; as that instrument is liable, as well as the four-coultered plough, to be thrown out of its work when meeting with a stone or other interruption. This the sward-cutter is proof against, which is looked on as its greatest excellence.

In preparing for barley, the sward-cutter excels a roller of any kind in reducing the large hard clods in clay land, occasioned by a sudden drought, after its being ploughed too wet; and it is likewise very proper for reducing such clay land when under a summer-fallow. In this operation, the sward-cutter is greatly to be preferred to the cutting-roller, likewise mentioned by Mr Young in one of his tours; for the wheels of the latter being all dependent one on another, when one is thrown out by a stone, three or four must share the same fate. Besides, the cutting-roller has but seven wheels in six feet; whereas the sward-cutter has six in four feet three inches, at nine inches

distant; and, if necessary, may have them so near as six inches.

After old grass ground is cut across with the sward-cutter and ploughed, it has a very uncommon and worklike appearance, from each square turned over by the plough being raised up an inch or two at the side last moved by the earthboard; so that the field when finished, is all prettily waved, and resembles a piece of water when blown on by a gentle breeze. By this means a very great deal of the land's surface is exposed to the frost and other influences of the air, which cannot fail to have a good effect on it.

Two horses are sufficient for the draught of a double-horse sward-cutter, and one horse for a single-horse one. One man manages the machine and drives the horses. He begins his operation by first measuring off 20 or 30 paces from the machine, less or more as he inclines, and there fixes a pole. He then cuts the field cross, as near at right angles with the ridges as he can. When the cutting wheels are past the last furrow about a yard or so, and the machine is upon the utmost ridge of the field on which it must turn, he must stop the horses; then take hold of the lever I, N^o 2. and by pulling it to him he raises the cutting wheels out of the ground, which are kept so by the loop of the rope being put over the pin R, in the lever I, N^o 3. till the machine is turned and brought to its proper place, which is done by measuring off the same distance formerly done on the opposite side of the field. When the cutting wheels are exactly over the outmost furrow, then, on the horses being stopped, the rope is slipped off the pin R, and the lever returned to its former place, as represented N^o 2. which allows the weights LL, &c. to force the cutting wheels into the ground again. He then goes on until the interval betwixt the first and second stroke of the machine is all cut. In this manner the field is to be finished, after which you may begin to plough when you please. (N. B. There must be a pole at each side of the field.)

It is of no consequence whether the land to be sward-cut is in crooked ridges or straight, in flat ridges or in very high raised ones. Be the surface ever so uneven, the cutting wheels, being all independent of one another, are forced by their weights into every furrow or hollow.

One sward-cutter will cut as much in one day as six ploughs will plough.

The land may lie several months in winter after being sward-cut, when there is no vegetation to make the cuts grow together again before it is ploughed; but the sooner it is ploughed after cutting the better, that it may have the benefit of all the winter's frost, which makes it harrow better at seed time.

When the ground is harrowed, the harrows ought to go with the waves which appear after ploughing, not against them, as by that means they are less apt to tear up the furrows all cut into squares. This, however, need only be attended to the two first times of harrowing, as they are called.

Any common wright and smith may make the instrument. It is very strong, very simple, and easily managed and moved from place to place; and, if put under cover, will last many years.

It was invented some time ago by the Honourable Robert Sandilands; and is represented in the Plate as

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Instruments of Husbandry. It has been lately improved by him, the price being at the same time reduced from 15l. or 16l. to 5l. or 6l.

3. The CULTIVATOR.

¹⁵⁵ The cultivator described. This instrument was invented by Mr William Lester of Northampton; and that gentleman received, from the Society for the encouragement of Arts, the society's silver medal. The purpose of this instrument is to pulverize tenacious soils that have been once plowed, in a much more complete and rapid manner than can be accomplished by any other instrument. It is thus described, Plate XII.—A, the beam; BB, the handles; CC, a cross bar of a femicircular form containing a number of holes, which allow the two bars DD to be placed nearer or further from each other.

DD are two strong bars moveable at one end upon a pivot E, and extending from thence in a triangular form to the cross bar C. In these bars are square holes, which allow the shares F placed therein to be fixed to any height required.

The seven shares marked F, are shaped at their lower extremities like small trowels; the upper parts of them are square iron bars.

GGG are three iron wheels on which the machine, is moved; they may be raised or lowered at pleasure.

H, the iron hook to which the single-tree and horses are to be fixed.

When the machine is first employed on the land, the bars DD are expanded as much as possible. As the soil is more loosened, they are brought nearer to the centre; and the shares then occupy a less space, and the soil will consequently be better pulverized.

In working on a rough fallow, therefore, the cultivator should be set for its greatest expansion, and contracted in proportion as the clods are reduced. The inventor declares himself confident that one man, a boy, and six horses, will move as much land in a day, and as effectually, as six ploughs, meaning land in a fallow state that has been previously plowed. It is requisite in some states of the soil to alter the breadth of the shares, but of this it is presumed that every farmer will be a proper judge. By the expansion and contraction of the cultivator, the points of the shares are in a small degree moved out of the direct line; but this is said to be so trifling as to prove no impediment to its working.

A certificate from Mr William Shaw of Cottenend, near Northampton, states, that he had used Mr Lester's cultivator, upon a turnip fallow in summer 1800; and that he believes it to be a very useful implement for cultivating the land in a fallow state by its working or scuffling off seven acres per day with six horses. He adds, that from its property of contracting and expanding, it is calculated to work the same land in a rough or fine state, by which means it unites the principles of two implements in one, and by the index on the axis it may be worked at any depth if required.

4. The BRAKE.

¹⁵⁶ Brake described, Plate VIII. Fig. 2. The brake is a large and weighty harrow, the purpose of which is to reduce a stubborn soil, where an ordinary harrow makes little impression. It consists of four square bulls, each side five inches, and six feet and a half in length. The teeth are 17 inches long, bending forward like a coulter. Four of them are inserted

into each bull, fixed above with a screw-nut, having 12 inches free below, with a heel clove to the under part of the bull, to prevent it from being pushed back by stones. The nut above makes it easy to be taken out for sharpening. This brake requires four horses or four oxen. One of a lesser size will not fully answer the purpose: one of a larger size will require six oxen; in which case the work may be performed at less expence with the plough.

This instrument may be applied to great advantage in the following circumstances. In the following strong clay that requires frequent ploughings, a braking between every ploughing will pulverize the soil, and render the subsequent ploughings more easy. In the month of March or April, when strong ground is ploughed for barley, especially if bound with couch-grass, a cross-braking is preferable to a cross-ploughing, and is done at half the expence. When ground is ploughed from the state of nature, and after a competent time is cross-ploughed, the brake is applied with great success, immediately after the cross-ploughing, to reduce the whole to proper tilth.

Let it be observed, that a brake with a greater number of teeth than above mentioned, is improper for ground that is bound together by the roots of plants, which is always the case of ground new broken up from its natural state. The brake is soon choked, and can do no execution till freed from the earth it holds. A less number of teeth would be deficient in pulverizing the soil.

4. The HARROW.

Harrowes are commonly considered as of no use but to cover the seed; but they have another use scarce less essential, which is to prepare land for the seed. This is an article of importance for producing a good crop. But how imperfectly either of these purposes is performed by the common harrow, will appear from the following account of it.

The harrow commonly used is of different forms. ¹⁵⁸ The first we shall mention has two bulls, four feet long of the and 18 inches asunder, with four wooden teeth in each, common A second has three bulls, and 12 wooden teeth. A third has four bulls, and 20 teeth of wood or iron, 10, 11, or 12 inches asunder. Now, in fine mould, the last may be sufficient for covering the seed; but none of them are sufficient to prepare for the seed any ground that requires subduing. The only tolerable form is that with iron teeth; and the bare description of its imperfections will show the necessity of a more perfect form. In the first place, this harrow is by far too light for ground new taken up from the state of nature, for clays hardened with spring drought, or for other stubborn soils: it floats on the surface; and after frequent returns in the same track, nothing is done effectually. In the next place, the teeth are too thick set, by which the harrow is apt to be choked, especially where the earth is bound with roots, which is commonly the case. At the same time, the lightness and number of teeth keep the harrow upon the surface, and prevent one of its capital purposes, that of dividing the soil: nor will fewer teeth answer for covering the seed properly. In the third place, the teeth are too short for reducing a coarse soil to proper tilth; and yet it would be in vain to make them longer, because ¹⁵⁸ Imperfection of the harrow.

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The harrow is too light for going deep into the ground. Further, the common harrows are so ill constructed, as to ride at every turn one upon another. Much time is lost in disengaging them. Lastly, it is equally unfit for extirpating weeds. The ground is frequently loosed with couch-grass, as to make the furrow-slice stand upright, as when old ley is ploughed: notwithstanding much labour, the grass roots keep the field, and gain the victory.

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Improved
harrows.
Plate VIII.
Fig. 3.

A little reflection, even without experience, will make it evident, that the same harrows, whatever be the form, can never answer all the different purposes of harrowing, nor can operate equally in all different soils, rough or smooth, firm or loose. The following, therefore, have been recommended; which are of three different forms, adapted for different purposes. They are all of the same weight, drawn each by two horses. Birch is the best wood for them, because it is cheap, and not apt to split. The first is composed of four bulls, each four feet ten inches long, three and a quarter inches broad and three and a half deep; the interval between the bulls 11 and three fourths inches; so that the breadth of the whole harrow is four feet. The bulls are connected by four thets, which go thro' each bull, and are fixed by timber nails driven through both. In each bull five teeth are inserted, ten inches free under the bull, and ten inches asunder. They are of the same form with those of the brake, and inserted into the wood in the same manner. Each of these teeth is three pounds weight: and where the harrow is made of birch, the weight of the whole is six stone 14 pounds, Dutch. An erect bridle is fixed at a corner of the harrow, three inches high, with four notches for drawing higher or lower. To this bridle a double tree is fixed for two horses drawing abreast, as in a plough. And to strengthen the harrow, a flat rod of iron is nailed upon the harrow from corner to corner in the line of the draught.

Fig. 4.

The second harrow consists of two parts, connected together by a crank or hinge in the middle, and two chains of equal length, one at each end, which keep the two parts always parallel, and at the same distance from each other. The crank is so contrived, as to allow the two parts to ply to the ground like two unconnected harrows; but neither of them to rise above the other, more than if they were a single harrow without a joint. In a word, they may form an angle downward, but not upward. Thus they have the effect of two harrows in curved ground, and of one weighty harrow in a plain. This harrow is composed of six bulls, each four feet long, three inches broad, and three and a half deep. The interval between the bulls nine and a half inches; which makes the breadth of the whole harrow, including the length of the crank, to be five feet five inches. Each bull has five teeth, nine inches free under the wood, and ten inches asunder. The weight of each tooth is two pounds; the rest as in the former.

Fig. 5.

The third consists also of two parts, connected together like that last mentioned. It has eight bulls, each four feet long, two and a half inches broad, and three deep. The interval between the bulls is eight inches; and the breadth of the whole harrow, including the length of the crank, is six feet four inches. In each bull are inserted five teeth, seven inches free

under the wood, and ten and an half inches asunder, each tooth weighing one pound. The rest as in the two former harrows.

These harrows are a considerable improvement. They ply to curved ground like two unconnected harrows; and when drawn in one plane, they are in effect one of these harrows of double weight, which makes the teeth pierce deep into the ground. The imperfection of common harrows, mentioned above, will suggest the advantages of the set of harrows here recommended. The first is proper for harrowing land that has long lain after ploughing, as where oats are sown on a winter furrow, and in general for harrowing stiff land: it pierces deep into the soil by its long teeth, and divides it minutely. The second is intended for covering the feed: its long teeth lays the feed deeper than the common harrow can do; which is no slight advantage. By placing the feed considerably under the surface, the young plants are, on the one hand, protected from too much heat, and, on the other, have sufficiency of moisture. At the same time, the feed is so well covered that none of it is lost. Seed slightly covered by the common harrows wants moisture, and is burnt up by the sun; beside, that a proportion of it is left upon the surface uncovered. The third harrow supplies what may be deficient in the second, by smoothing the surface, and covering the feed more accurately. The three harrows make the ground finer and finer, as heekles do lint; or, to use a different comparison, the first harrow makes the bed, the second lays the seed in it, the third smooths the clothes. They have another advantage not inferior to any mentioned: they mix manure with the soil more intimately than can be done by common harrows; and upon such intimate mixture depends greatly the effect of manure, as has already been explained. To conclude, these harrows are contrived to answer an established principle in agriculture, That fertility depends greatly on pulverizing the soil, and on an intimate mixture of manure with it, whether dung, lime, marl, or any other.

The Chain and Screw Harrow. Fig. 8. is the plan of a harrow also invented by Mr Sandilands, and to which he has given the name of the *chain and screw harrow*. Its properties are, that if your ridges be high, and you wish to harrow them from one end to the other, by lengthening the chain (which the screw commands), the harrow, when drawn along, forms an angle, downwards, and misses none of the curve of the ridge, so far as it extends (which may be nine feet, the distance from A to B. The extent, in the contrary direction, is five feet six inches). When the crowns of the ridges have got what is thought a sufficient harrowing lengthwise, you shorten the chain by the screw, which forms an angle upwards; the harrow is then drawn by the horses, one on each side of the furrow; which completely harrows it, and the side of the ridges, if 18 feet broad.

When you want to harrow even ground or high ridges across with the screw, you can bring the harrow to be horizontal, so as to work as a solid harrow without a joint.

The teeth are formed and fixed in the common manner, square, not in the fashion of coulters; and are nine or ten inches below the wood, and of such strength as it is thought the land requires. The teeth cut, or rather

¹⁶¹
 Instruments of Husbandry. ther tear, the ground at every four inches without variation, though seemingly placed irregularly; and this without any risk of choking, except sometimes at the extreme angles, where the teeth are necessarily near each other; but which may be cleaned with the greatest ease, by raising them a little from the ground. The figures 1, 2, &c. point out where the 12 teeth on each side of the harrow are placed.

Where a strong brake-harrow is not necessary, by making the teeth shorter and lighter you may have 48 teeth, which will tear the ground at every two inches, cover the seed well, and make a fine mould.

It is recommended, that harrows for every purpose, and of any size, be made on the above principle; by which no tooth can ever follow the track of another, and all of them will be kept constantly acting.

5. The ROLLER.

¹⁶¹
 The roller. The roller is an instrument of capital use in husbandry, though, till of late years, scarcely known in ordinary practice; and where introduced, it is commonly so slight as to have very little effect.

Rollers are of different kinds; stone, cast-iron, wood. Each of these has its advantages. We would recommend the last, constructed in the following manner: Take the body of a tree, six feet ten inches long, the larger the better, made as near a perfect cylinder as possible. Surround this cylinder with three rows of staves, one row in the middle, and one at each end. Line these staves with planks of wood equally long with the roller, and so narrow as to ply into a circle. Bind them fast together with iron rings. Beech wood is the best, being hard and tough. The roller, thus mounted, ought to have a diameter of three feet ten inches. It has a double pair of shafts for two horses abreast. These are sufficient in level ground; in ground not level, four horses may be necessary. The roller without the shafts ought to weight 200 stone Dutch; and the large diameter makes this great weight easy to be drawn.

¹⁶²
 Season for rolling. Rolling wheat in the month of April is an important article in loose soil; as the winter rains pressing down the soil leave many roots in the air. Barley ought to be rolled immediately after the seed is sown; especially where grass seeds are sown with it. The best time for rolling a gravelly soil, is as soon as the mould is so dry as to bear the roller without clinging to it. A clay soil ought neither to be tilled, harrowed, nor rolled, till the field be perfectly dry. And as rolling a clay soil is chiefly intended for smoothing the surface, a dry season may be patiently waited for, even till the crop be three inches high. There is the greater reason for this precaution, because much rain immediately after rolling is apt to cake the surface when drought follows. Oats in a light soil may be rolled immediately after the seed is sown, unless the ground be so wet as to cling to the roller. In a clay soil, delay rolling till the grain be above ground. The proper time for sowing grass seeds in an oat field, is when the grain is three inches high; and rolling should immediately succeed, whatever the soil be. Flax ought to be rolled immediately after sowing. This should never be neglected; for it makes the seed push equally, and prevents after-growth; the bad effect of which is visible in every step of the process for dressing flax. The

first year's crop of sown grasses ought to be rolled as early the next spring as the ground will bear the horses. It fixes all the roots precisely as in the case of wheat. Rolling the second and third crops in loose soil is an useful work; though not so essential as rolling the first crop.

¹⁶³
 Effects of rolling. In the first place, rolling renders a loose soil more compact and solid; which encourages the growth of plants, by making the earth clap close to every part of every root. Nor need we be afraid of rendering the soil too compact; for no roller that can be drawn by two or four horses will have that effect. In the next place, rolling keeps in the moisture, and hinders drought to penetrate. This effect is of great moment. In a dry season, it may make the difference of a good crop, or no crop, especially where the soil is light. In the third place, the rolling grass seeds, beside the foregoing advantages, facilitates the mowing for hay; and it is to be hoped, that the advantage of this practice will lead farmers to mow their corn also, which will increase the quantity of straw both for food and for the dung-hill.

There is a small roller for breaking clods in land intended for barley. The common way is, to break clods with a mell; which requires many hands, and is a laborious work. This roller performs the work more effectually, and at much less expence: let a harrowing precede, which will break the clods a little; and after lying a day, or a day and a half, to dry, this roller will dissolve them into powder. This however does not supersede the use of the great roller after all the other articles are finished, in order to make the soil compact, and to keep out the summer drought. A stone roller four feet long, and fifteen inches diameter, drawn by one horse, is sufficient to break clods that are easily dissolved by pressure. The use of this roller in preparing land for barley is gaining ground daily, even among ordinary tenants, who have become sensible both of the expence and toil of using wooden mells. But in a clay soil, the clods are sometimes too firm, or too tough, to be subdued by so light a machine. In that case, a roller of the same size, but of a different construction, is necessary. It ought to be surrounded with circles of iron, six inches asunder, and seven inches deep; which will cut even the most stubborn clods, and reduce them to powder. Let not this instrument be considered as a finical refinement. In a stiff clay it may make the difference of a plentiful or scanty crop.

6. The FALLOW-CLEANSING MACHINE.

¹⁶⁴
 The fallow-cleansing machine. This was invented by Mr Aaron Ogden, a smith at Ashton-under-Line, near Manchester in Lancashire. It is intended for cleansing fallows from weeds, &c. which exhaust the riches of the soil. A, A, is the frame; B, the first roller; C, the second ditto; in which last are two cranks to move the arms D, D, which work the rake up the directors fixed on the plank E. The under side of the lower ends or shares of these directions are sharp, to cut the clods and let them come on the upper side. Each alternate heel of the share is longer than the intermediate one, that they may not have more than one-half to cut at once. At the back of the plank E are two screws to let it loose, that the directors may be set higher or lower. The shares are to penetrate the ground two or three inches, to raise the quicks till the rake I, I, fetches

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fetches them into the cart H, where a man must be ready with a muck-hook to clear them backward when gathered. In the rake I are two teeth for every space of the directors, that stones, &c. may be gathered without damage. K, K, are two staples, by which the machine is drawn: under them at *b* are two hooks, placed low to raise the machine in turning, by the help of the traces; and the axle-tree of the cart should be fixed upon a pin, that it may turn like a waggon. F, F, are the triggers to throw the rake behind the roots. The long teeth at G, G, are to cleave the roller C. I, I, is the rake which gathers up the weeds into the cart H, and is drawn above the trigger F by the working of the arms D, expressed by the dotted lines at *dd, iii*. The triggers F, of which there is one on each side, move on the pivots *a*; so that when the points *b* of the rake I have been drawn up by the directors E to the part marked *c*, the trigger, giving way, permits the rake to pass; but immediately falling, the rake returns along the upper surface of the trigger marked *e, e*, and of course falls on the weeds when it comes to the end, a little beyond the pivot *a*. The reader will observe, that the boarding is taken away on one side, in the Plate, in order to give a more perfect view of the inner parts of the machine; and in fact it would perhaps be better if all the boarding, marked L, L, L, was taken away, and frame-work put in its stead. The cart H might undoubtedly also be made lighter. The wheels M, M, appear in the Plate to be made of solid wood: but there is no necessity they should be so. At N, is another view of the roller C, by which the disposition of the spikes may be easily comprehended. Suppose the circle O, described by the end of the roller N, to be divided by four straight lines into eight equal segments, as represented at P. Let the same be done at the other end of the roller, and parallel lines be drawn from one corresponding point to the other the length of the roller; mark the points with figures 1, 2, 3, 4, 5, 6, 7, 8; afterwards draw oblique lines, as from 1, at the end of O, to 2, at the other end, and from 2 to 3, &c. on these oblique lines the spikes are to be fixed at equal distances, in eight circles, described on the circumference of the roller. The spikes of the small roller B are fixed in the same manner, except that the diameter being smaller, there are only six instead of eight rows. R is another view of the directors, with the plank E on which they are fixed; and S is a section of a part of the plank, with one of the directors as fixed, in which may be seen the heel *m*, from whence to the point of the share *n* is a sharp cutting edge. See the same letters in figure R. At T is one of the long teeth to be seen at G; it is bent towards the roller C, which it serves to cleanse. When the end of the rake *b*, after rising above *c*, is pushed, by the motion of the arms D, D, along the upper part *e, e*, of the trigger F, and comes to the end beyond *a*; as it falls, the part of the arm marked *o* rests in the notch *p*, till it is again raised by the motion of the roller C with the rake. The roller C is to be one foot diameter, the spikes nine inches long, that they may go through the furrow (if the soil should be loose) into the hard earth, the more effectually to work the rake, which otherwise might be so overcharged as to cause the roller to drag without turning. In the rake-ends *b* there should

be pivots, with rollers or pullers on, to go in the groove, to take off the friction; and they would likewise take the triggers more surely as the rake comes back. The rake should also be hung so far backward, that when it is fallen the arms of it may lie in the same plane or parallel with the directors, on which it comes up (which will require the frame to be two inches longer in the model). This will cause the rake to fall heavier, and drive the teeth into the roots, and bring them up without shattering. These teeth must be made of steel, very fine, and so long as to reach down to the plank on which the directors are fixed, that is to say, six inches long (the directors are also to be made six inches broad above the plank). The rake-head should also fall a little before the crank is at its extremity, which will cause the rake to push forward to let the teeth come into the roots. The rake-teeth must drop in the same plane with the roller and wheels, or on the surface of the earth. No more space should be given from the roller C to the long teeth at G G than that the rake may just miss the spikes of the roller C and fall on the places before mentioned. As the first roller B was intended to cleanse the second C more than for any other use, it may be omitted when the machine is made in large, as Mr Ogden has lately found that the long teeth at G G answer the end alone, and this renders the machine about a sixth part shorter. Now, to suit any sort of earth, there should be to each machine three planks, with directors at different spaces to use occasionally; in the first, the spaces between the directors should be eight inches wide, in the second six, and in the third four. This will answer the same end as having so many machines.

As there may be some objections to the rake not leaving the roots when it has brought them up, Mr Ogden has several methods of cleansing it; but as he would make it as simple as possible, he chooses to let it be without them at present; but suppose it should bring some roots back again with it, it will probably lose them before it gets back to the extremity; whence they will lie light, and be of but little detriment to the others coming up. Mr Ogden would have the first machine made four feet six inches wide, the teeth divided into equal spaces, the out-sides into half spaces.

7. The new-invented Patent Universal Sowing Machine.

This machine, whether made to be worked by hand, drawn by a horse, or fixed to a plough, and used with it, is extremely simple in the construction, and not liable to be put out of order; as there is but one movement to direct the whole, nor does it require any skill in working. It will sow wheat, barley, oats, rye, clover, cole-seed, hemp, flax, canary, rape, turnip, besides a great variety of other kinds of grain and seeds broad-cast, with an accuracy hitherto unknown. It is equally useful in the new husbandry, particularly when fixed to a plough; it will then drill a more extensive variety of grain, pulse, and feed (through every gradation, with regard to quantity, and deliver each kind with greater regularity than any drill-plough whatever. When used in this manner, it will likewise be found of the utmost service to farmers who are partial to the old husbandry, as, among many other very valuable and peculiar properties, it will not only sow

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Universal
sowing
machine,
Plate X.
fig. 1. 2. 11.

Instruments of Husbandry. in the broad-cast way with the most singular exactness, but save the expence of a seedsmen; the seed being sown (either over or under furrow at pleasure), and the land ploughed, at the same operation.

Perhaps a fair and decisive experiment for ascertaining the superior advantage of broad-casting or drilling any particular crop, was never before so practicable; as the seed may now be put in with the utmost degree of regularity, in both methods of culture, by the same machine; consequently, the seed will be sown in both cases with equal accuracy, without which it is impossible to make a just decision.

The excellence of this machine consists in spreading any given quantity of seed over any given number of acres with a mathematical exactness, which cannot be done by hand; by which a great saving may be made in feeding the ground, as well as benefiting the expected crop.

There has always been a difficulty in sowing turnip seed with any degree of exactness, both from the minuteness of the seed, and the smallness of the quantity required to be sown on an acre. Here the machine has a manifest advantage, as it may be set to sow the least quantity ever required on an acre; and with an accuracy the best seedsmen can never attain to.

It will also sow clover, cole, flax, and every other kind of small seed, with the utmost degree of regularity,

It will likewise broad-cast beans, pease, and tares, or drill them with the greatest exactness, particularly when constructed to be used with a plough.

Another advantage attending the use of this machine is, that the wind can have no effect on the falling of the seed.

Of the Machine when made to be used without a Plough, and to be drawn by a Horse.—It may in this case be made of different lengths at the desire of the purchaser. The upper part A A A A, contains the hoppers from which the grain or seed descends into the spouts. The several spouts all rest upon a bar, which hangs and plays freely by two diagonal supporters B B; a trigger fixed to this bar bears a catch-wheel; this being fixed on the axle, occasions a regular and continual motion, or jogging of the spouts, quicker or slower in proportion to the pace the person sowing with it drives; and of course, if he quickens his pace, the bar will receive a greater number of strokes from the catch-wheel, and the grain or seed will feed the faster. If he drives slower, by receiving fewer strokes, the contrary must take place. In going along the side of a hill, the strength of the stroke is corrected by a spring which acts with more or less power, in proportion as the machine is more or less from a horizontal position, and counteracts the difference of gravity in the bar, so that it presses, in all situations, with a proper force against the catch-wheel. This spring is unnecessary if the land be pretty level. At the bottom of the machine is placed an apron or shelf in a sloping position; and the corn or seed, by falling thereon from the spouts above, is scattered about in every direction under the machine, and covers the ground in a most regular and uniform manner.

To sow the corn or seed in drills, there are moveable spouts (see fig. 10.), which are fixed on or taken off at pleasure, to direct the seed from the upper spout to the bottom of the furrow.

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The machine is regulated for sowing any particular quantity of seed on an acre by a brass slider, A, fig. 7. fixed by screws against a brass bridge on each of the spouts. The machine is prevented from feeding while turning at the ends, by only removing the lever E, fig. 2. out of the channel G, to another at H, on the right hand of it, which carries back the bar from the catch-wheel, and occasions the motion of the spouts to cease, and at the same time brings them upon a level by the action of the diagonal supporters; so that no corn or seed can fall from them.

The machine in this form is particularly useful for broad-casting clover upon barley or wheat; or for sowing any other kind of seed, where it is necessary that the land should first be harrowed exceedingly fine and even.

Manner of using the Machine, when drawn by a Horse.—Place the machine about two feet from the ends of the furrows where you intend it shall begin to sow. Fill the hoppers with seed, and drive it forwards with the outside wheel in the first furrow. When you are at the end of the length, at the opposite side of the field, lift the lever E, fig. 2. into the channel H, and the machine will instantly stop sowing. Drive it on about two feet, and then turn. Fill the hoppers again if necessary; then remove the lever back again into the channel G, and in returning, let the outside wheel of the machine go one furrow within the track which was made by it, in passing from the opposite end; as for example, if the wheel passed down the eighth furrow from the outside of the field, let it return in the seventh; and in every following length let the outside wheel always run one furrow within the track made by the same wheel: because the breadth sown is about nine inches less than the distance between the wheels.

Let the machine be kept in a perpendicular situation. If the farmer wishes to sow more or less seed on any one part of the field than the other, it is only raising the handles a little higher, or sinking them a little lower than usual, and it will occasion a sufficient alteration; and should the last turn be less in breadth than the machine, those spouts which are not wanted may be taken up from the bar, and prevented from feeding, by turning the knob above them.

Also, when the land required to be sown has what is called a *vent*, that is, when the sides of the field run in an oblique line to the furrows, which by this means are unequal in length; the spouts must be taken up or let down in succession by turning the knobs, as that part of the machine where they are placed arrives at the ends of the furrows. This is done while the machine is going forwards.

If the land be tolerably level, the machine may be fixed by the screw in the front, and the machine may then be used by any common harrow boy.

Method of regulating the Machine.—In each spout is fixed a bridge (see fig. 7.), with an aperture in it, B, for the grain or seed to pass through. This aperture is enlarged or contracted by a slider, A, which passes over it; and, when properly fixed for the quantity of seed designed to be sown on an acre, is fastened by means of two strong screws firmly against the bridge. This is made use of in sowing all kinds of seed, where it is required to sow from one bushel upwards on an acre. To sow one, two, three gallons, or any of the intermediate

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mediate quantities, as of clover, cole-seed, &c. the brass plate, fig. 6. is placed between the bridge and the slider, with the largest aperture B downwards, which aperture is enlarged or contracted by the slider as before. To sow turnips, the same plate is placed between the bridge and the slider, with its smallest aperture A downwards, and the hollow part about the same aperture inwards.

Fig. 8. is a view of the regulator, by which the apertures in the several spouts are all set exactly alike, with the utmost ease, to make them feed equally. The extreme height of the largest aperture is equal to the breadth AB, and the breadth at C is equal to the height of the smallest aperture used, viz. that for turnips. The side AC is divided into 60 equal parts, and on it moves the slider or horse D; which being placed at any particular degree, according to the quantity of seed required to be sown on an acre, is fixed upon it, by a screw on the side of the slider or horse. When this is done, the end of the regulator is put through the aperture in the bridge or plate (whichever is intended to be used), and the slider against the bridge in the spout, raised by it, till it stops against the horse on the regulator: then the slider is fastened against the bridge firmly by the two screws; care being taken at the same time that it stand nearly square.

By this means the spouts (being all fixed in the same manner) will feed equally.

It is easy to conceive that the size of the apertures, and consequently the quantity of seed to be sown on an acre, may be regulated with a far greater accuracy than is required in common practice.

The spouts may be regulated with the utmost nicety, in five minutes, to sow each particular seed, for the whole season. But a little practice will enable any person, who possesses but a very moderate capacity, to make the spouts feed equally, even without using the regulator (A).

Of the Machine, when made to be used by Hand.—The difference of the machine in this case is, that it is made lighter, with but three spouts, without shafts, and is driven forwards by the handles. It hath also a bolt in front, which being pushed in by the thumb, releases the machine; so that it can then easily be placed in a perpendicular position. This alteration is necessary to keep the handles of a convenient height, in sowing up and down a hill, where the slope is considerable; and is done while the machine is turning at the end of the length. The method of regulating and using it is the same as when made to be drawn by a horse.

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Of the Machine, when constructed to be used with a Plough.—This is, without doubt, the most useful application of the machine; and it can be fixed without difficulty to any kind of plough, in the same manner as to that represented in fig. 1.

The advantages arising from the use of it are great and numerous; for, beside the increase in the crop, which will be ensured by the seeds being broad-cast with a mathematical nicety, a large proportion of seed (the value of which alone, in a few months, will amount to more than the price of the machine) and the seedsman's labour will be saved. The seed may likewise be sown either under or over furrow; or one cast each way, as is practised by some farmers. The seeds also, being cast by the machine upon the fresh ploughed land, may be immediately harrowed in, before the mould has lost any part of its moisture; which in a dry season will greatly promote the crop. In drilling any kind of grain, pulse, or feed, it possesses every property that can be wished for in the best drill-plough, nor will it (as most of them do) bruise the seed, or feed irregularly. The construction of the machine is the same as the large ones, except being made with one hopper and spout instead of several, and the apron moveable instead of being fixed, as may be seen by inspecting fig. 4. The only alteration necessary to make the machine broad-cast or drill is, in the former case to place the apron B, fig. 1. at the bottom of the machine, upon the hooks FF, sloping either towards the furrows or the unploughed land, according as it is intended to sow the seed, either over or under furrow. Whenever the apron is required to be shifted, it is done in less than a second of time; as it only requires to be moved up or down with the hand, when a catch fixes it.

To prepare it for drilling, instead of the apron, place the long spout, fig. 10. upon the brackets, on the front of the machine, by the ears AA, to receive the feed from the upper spout, and fasten the lower end of it, by a small cord, to that hook upon which the apron is hung for broad-casting which is next the plough (see fig. 3.); the feed will then be directed by the long spout, to the centre of the furrow, near the heel of the plough. The spring for correcting the strength of the stroke, is necessary only when they are required to go along the side of a considerable declivity. The machine, when fixed to a plough, does not require the smallest degree of skill in using, as nothing is necessary but to keep the hopper filled, which will contain a sufficient quantity of feed to go upwards of 140 rods, before it will want refilling, when three bushels and a half

(A) Proper directions are given with each machine for using it, as also for fixing the sliders to sow any particular quantity of corn or seed on an acre, so as to enable any person to set the spouts.

The prices of the machine (exclusive of the packing cases) are as follow. If constructed to be used with a single furrow plough; the wheel, with the axle and cheeks steeled, strap, regulator, brass-plates for broad-casting or drilling turnips, lucerne, tares, wheat, barley, &c. &c. &c. and every article necessary for fixing it included, three guineas and a half. If made with a spring (for sowing on the side of a hill, where the slope is considerable), but which is very rarely necessary, five shillings more. If made to be fixed to any double-furrow plough, four guineas and a half.

The large machine, fig. 2. when made to broad-cast seven furrows at a time and to be drawn by a horse, eight guineas and a half. If constructed to sow five furrows at a time, and to be used by hand, six guineas. These are also five shillings more if made with a spring.

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half are sown on an acre. The accuracy with which it will broad-cast, may in some measure be conceived, by considering that the seed regularly descends upon the apron or shelf, and is from thence scattered upon the ground, in quantity exactly proportioned to the speed of the plough: also that each cast spreads to the third furrow: and by this means shuts upon the last. In this manner it is continually filling up till the whole field is completely covered; so that it is impossible to leave the smallest space without its proper quantity of seed.

When the plough is wanted for any other purpose, the machine, with the wheel at the heel of the plough for giving it motion, can be removed or replaced at any time in five minutes.

Fig. 11. represents the machine fixed to a double-furrow creasing plough, and prepared for drilling. As this plough may not be generally known, it will not be improper to observe, that it is chiefly used for creasing the land with furrows (after it has been once ploughed and harrowed); which method is necessary when the seed is to be sown broad-cast upon land that has been a clover ley, &c. because, if the seed be thrown upon the rough furrows, a considerable part of it will fall between them, and be unavoidably lost, by lying too deep buried in the earth. This mode answers extremely well, and partakes of both methods of culture; the seed, though sown broad-cast, falling chiefly into the furrows.

The machine is very useful for sowing in this manner; as the seed is broad-cast, with an inconceivable regularity, at the time the land is creased. The advantages it likewise possesses for drilling all sorts of grain or seed with this plough, are too evident to need mentioning.

The machine, when constructed to be used with a double-furrow plough, is made with two upper and two long spouts for drilling, two aprons for broad-casting, and with a double hopper; but in other respects the same as when intended for a single furrow plough: it is used in all cases with the greatest ease imaginable.

The interval between the points of the two shares of a creasing plough is usually ten inches; the beam about nine feet long; and the whole made of a light construction.

A more particular explanation of the figures.—Fig. 1. The machine fixed to a Kentish turn wrest plough. A, The machine. B, The apron upon which the seed falls and rebounds upon the land, in broad-casting. C, Lid to cover the hopper. D, Wheel at the heel of the plough. E, Strap. FF, Hooks, upon which the apron turns by a pivot on each side. G, Stay, to keep the machine steady. H, Lever, to prevent it from sowing.

Fig. 2. The machine constructed to be drawn by a horse. AAAA, The hoppers. BB, The diagonal supporters. CCCC, The upper spouts. D, The apron or shelf upon which the seed falls from the upper spouts. E, The lever, which carries back the bar, and prevents the machine from sowing. FF, Staples upon the handles, through which the reins pass, for the man who conducts the machine, to direct the horse by. I, Screw, to fix the machine occasionally. N. B. The knobs (by turning which each particular spout may be taken from off the bar, and thereby prevented from

feeding) are over each upper spout; but, to prevent confusion, are not lettered in the Plate. Preparation of Land.

Fig. 3. is the same machine with that in fig. 1. The dotted lines, expressing the situation of the long spout, when the apron is removed, and the machine adapted for drilling.

Fig. 4. Also the same machine, with the front laid open to show the inside. A, The catch-wheel fixed upon the axle. BB, The axle upon which the machine hangs between the handles of the plough. C, The pulley, by which the strap from the wheel at the heel of the plough turns the catch-wheel. D, the bar, upon which the upper spout rests, suspended by the diagonal supporters EE, bearing against the catch-wheel by the trigger F, and thereby kept in motion while the plough is going. G, The apron in a sloping position, upon which the corn or seed falls from the upper spout, and is scattered by rebounding upon the land. It turns upon pivots, and by this means throws the seed either towards the right hand or left at pleasure.

Fig. 5. The upper spout.

Fig. 6. The plate which is placed between the bridge and the slider, for sowing small seeds. The aperture A being downwards for sowing turnips; the larger one B downwards for sowing clover, &c.

Fig. 7. The bridge, fixed in the upper spouts. A, The slider, which contracts or enlarges the different apertures. B, The aperture in the bridge, through which the seed passes, when sowing any quantity from one bushel upwards on an acre.

Fig. 8. The regulator, made of brass. D, The slider or horse which moves upon it, and is fixed at any particular degree by a screw in its side.

Fig. 9. represents the movement in the machine fig. 2. AAAA, Cleets, between which the upper spouts rest. BB, The diagonal supporters, by which the bar with the upper spouts hang. C, The catch-wheel. DD, The axle. E, The trigger upon the bar, which bears against the catch-wheel. FF, Stays from the back of the machine, by which the bar plays.

Fig. 10. The long spout. AA, The ears by which it hangs.

SECT. II. *Of preparing Land for cropping, by removing obstructions and bringing the Soil into a proper state.*

I. OF REMOVING STONES.

It is of the utmost importance to have land effectually cleared of stones, before undertaking any agricultural operation upon it; for by means of them there is frequently more expence incurred in one season, by the breaking of ploughs and the injury suffered by the cattle and harness, than would remove the evil. It has also been observed that the soil round a large stone is commonly the best in the field. It may be considered as purchased at a low rate by removing the stone. At any rate, such stones must be removed before the ground can be properly cultivated. For whether a large stone occupy the surface, or lie beneath it, but within reach of the plough, a considerable space around it cannot be stirred by that instrument, and is therefore useless. Even the rest of the field where

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stones abound must be laboured in a more slow and tedious manner, on account of the caution necessary to avoid the danger which they produce.

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The stones which impede the improvement of land are, 1st, loose stones, or such as are thrown up to the surface by the plough; and, 2dly, sitfast stones, which are either upon or immediately below the surface, but are of such magnitude that they cannot be stirred by the plough. The first kind of stones may usually be easily removed by being gathered and carried off. When land is laid down for hay, such stones are often improperly thrown in heaps into the furrows, where they ever after continue to interrupt the plough, or are dragged again by the harrows over the land. Instead of proceeding in this manner, they ought to be carried wholly off the field in carts at the driest season of the year, and placed in situations in which they may be rendered useful to the farm. In this point of view, stones are sometimes of considerable value for making concealed drains, or for making and repairing the roads through a farm, and also for the repairs of some kinds of fences.

The only writer upon agriculture who has in any case objected to the propriety of clearing land of small stones, is probably Lord Kames. In some parts of the south of Scotland, and particularly in Galloway, the soil is said to be composed in a great measure of gravel, and of stones of a smooth surface, as if worn by the running of water. After being ploughed, the whole surface of every field appears to be composed of loose stones lying almost in contact with each other. Some industrious farmers, with great labour, collected and removed the stones from a few of their fields with a view to their improvement; and the result is said to have been, that the succeeding crops were wholly blighted in the tender blade, and never came to maturity. The stones upon the surface were supposed to have prevented the exhalation of the moisture from the shallow and extremely porous and open soil which they covered: and they were also supposed to have contributed to foster the young plants, by reflecting powerfully from their smooth surfaces the sun's rays in every direction around them: but when they were removed, the soil, in that bleak climate, became at once too cold and too dry for any purpose of agriculture. The farmers, therefore, who had with so much toil and cost removed the stones from part of their lands, could think of no better remedy than, with equal toil, to bring them all back again, and carefully replace them upon their fields. It is added, that the soil immediately resumed its wonted fertility. The truth of this anecdote has never been contested; and there is no doubt that it has long been current in the south of Scotland, both previous to its publication by Lord Kames, and after that period, among a class of persons who are very unlikely to have been acquainted with his writings. It is possible that the replacing the stones was the best remedy for the want of fertility in the soil which its cultivators had within their reach: but it is probable that they might have found it of more importance to have covered the surface of their land with a substantial coat of clay marl, or even with almost any kind of earth or clay obtained from the bogs and swamps that usually abound in these countries, providing only they could obtain a quantity of lime to add to it. In this way, possessing

land whose bottom was very pervious to moisture, they might have obtained a soil suited to every purpose of agriculture; whereas, in its present state, it must remain for ever unfit to be touched with the scythe.

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With regard to large or sitfast stones which cannot be removed by any ordinary effort, they usually either appear fully above the surface or are concealed immediately under it. For the sake of discovering concealed stones, it is said to be a custom in Yorkshire, when they intend to reduce waste and rude land under the plough, in the first place, carefully to go over the whole surface with sharp prongs, which at the distance of every twelve or fourteen inches they thrust into the ground to the depth of above a foot, and wherever a stone meets the prong they mark the spot with a twig, a bit of wood, or some other object. They afterwards trace all the marks, and remove every stone before they touch the land with the plough.

Concerning the modes which have been adopted for removing large stones out of the way of the plough; one of the simplest is the following: A pit or hole is dug beside the stone, 16 or 18 inches deeper than the height or thickness of the stone. A number of men are then assembled, who tumble it into the pit. It is immediately covered up with a part of the earth that came out of the hole; and the rest of the earth is scattered over the field, or employed in bringing to a level with the rest of the soil the spot where the stone formerly lay. As the stone now remains at a greater depth than the plough can reach, it is no longer an impediment to agriculture. In performing this operation, however, the workmen must attend to the nature of the soil, and take care that the weight of the stone do not bring down the side of the pit, which might be attended with dangerous consequences. To obviate any hazard of this kind, it is always proper to have at hand a stout plank, which ought to be laid across the pit or hole, immediately under the nearest corner or edge of the stone. With this precaution, a single man may usually perform the whole operation of burying stones or pieces of rock of very great size and weight.

By the above operation, however, the stones are utterly lost; whereas they may sometimes be of considerable value for fences or other buildings. When this is the case, they must be broken to pieces before they are removed. With this view it is to be observed, that a great variety of stones have some thin veins, which being found, wedges can be driven into them by large hammers, so that they may be easily broken. For such operations spades and pick axes are necessary to clear away the earth, and a large and a small lever to turn the stones out of the ground. Hammers and wedges are also requisite, with carts, to remove the fragments from the field. In the Statistical Account of Scotland, vol. xix. p. 565. parish of Maderty, we are told that "the Rev. Mr Ramsay, the present incumbent, who occupies a piece of land full of sitfast stones, constructed a machine for the purpose of raising them. It operates on the principles of the pulley and cylinder, or wheel and axis, and has a power as one to 24; it is extremely simple, being a triangle, on two sides of which the cylinder is fixed; it can be easily wrought and carried from place to place by three men. A low four-wheeled machine of a strong construction is made to go under the arms of the triangle, to receive the

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It is evident, that the machine here described is only valuable for getting stones out of the way in the gross and unbroken; and, accordingly, we learn that stone fences are almost unknown in the parish of Maderdy.

Where stones are valuable, therefore, and the operation of breaking them with hammers and wedges is found impracticable or too laborious, it will be necessary to blast them with gunpowder. To perform this operation properly, however, considerable experience is requisite; for it is said, that a skilful workman can in most instances, by the depth and position of the bore, contrive to rend stones into three equal pieces without causing their fragments to fly about. In time of war, however, the expence of gunpowder is apt to become very great. With a view to diminish the cost of that article, it has been suggested, that it is proper to perform the operation not with gunpowder alone, but with that article of a good quality, mixed up with about one-third of its bulk of quicklime in fine powder. It is said that this composition possesses as much force as an equal quantity of pure gunpowder, and it is even alleged, that the proportion of quicklime may be increased with advantage. How the strength of gunpowder should be so much augmented by the addition of quicklime, we do not know. Perhaps it may add to the force of the explosion by undergoing a chemical decomposition of its parts, as it has of late been suspected, that this mineral is by no means a simple or uncompounded body.

Where a field is very greatly overrun with concealed stones, the most effectual method of getting quit of them, and of rendering it permanently arable, consists of trenching it wholly by the spade. Nor is this always the most expensive mode of proceeding. The trenching can be done at the rate of from 3l. to 4l. per Scots acre, which is one-sixth larger than an English acre, allowing at the same time the stones or their price at the quarry to the labourers. In this way, the expence of ploughing the field is saved. The soil is deepened to the utmost extent of which it is capable, and can be laid out in the form most convenient for cultivation. In Dr Anderson's report of the state of agriculture in Aberdeenshire, it is said that the expence of trenching an acre to the depth of from 12 to 14 inches, where the stones are not very large and numerous, runs from 4d. to 6d. a fall, which is from 2l. 13s. to 4l. per Scots acre. Ground that has been formerly trenched, is sometimes done as low as 2d. per fall, or 1l. 6s. 6d. per acre. Hence, in consequence of the practice of trenching ground by the spade being not unfrequent in Aberdeenshire, workmen have become expert, and by competition have rendered the price extremely moderate. It is to be wished that the same practice were more frequent in other parts of the country, as it would have a tendency to introduce a taste for the most correct and perfect of all modes of labouring the soil, and would also occupy a considerable part of the population of the country, in the most innocent and healthful of all employments, that of agriculture.

2. Of DRAINING.

It has already been remarked, that the presence of moisture is of the utmost importance to the success of vegetation. At the same time, as must necessarily happen with every powerful and active agent, the too great abundance of water is no less pernicious to many plants, than an entire want of it. When it stagnates upon the soil, it decomposes or rots the roots and stems of the most valuable vegetables. Even when it does not remain on a spot round the whole year, its temporary stagnation during the winter renders the land unproductive. Seasons of tillage are often lost, and in wet years the crop must always be scanty and precarious. When in grass, the land can only produce the coarsest and most hardy vegetables, which can resist the chill or cold state of the soil, or the fermentation which is often produced by sudden warmth while the water remains upon the ground. Hence arises the importance of draining, by which arable land is rendered manageable, is made to dry gradually and early in the spring, and the corn is increased in quantity and weight; and by which, in pasture lands, the grasses are made to change their colour and to lose their coarse appearance, and the finer kinds of plants are enabled to flourish. Even the climate is, by means of draining, very considerably improved. It is rendered less cold during the winter, and by diminishing in hot weather the exhalations from the soil, its salubrity both to animal and vegetable life is greatly increased. Every kind of grain comes earlier to maturity. The harvest is less precarious, and the diseases are banished which arose from a damp soil and a humid atmosphere.

The water which stagnates upon the surface of a soil may originate from two causes. It may descend upon it in the form of rain, or it may ascend from springs or reservoirs of water in the bowels of the earth. The rules of draining land which is rendered too wet for the purposes of agriculture are different, according to the causes which occasion the wetness. We shall first take notice of the most approved modes of draining, when the excessive moisture is occasioned by rain water stagnating upon the land; and we shall afterwards take notice of the plan of draining to be adopted, when the wetness arises from springs or water arising out of the earth.

To relieve land from rain water that is apt to stagnate upon it, two kinds of drains have been adopted. One of these is called *open drains*, from their being exposed to view in their whole length. The other kind receives the appellation of *hollow drains*, from their being covered, so that their existence is not apparent to a stranger, nor is any part of the land lost in consequence of their being made. Hollow draining is sometimes avoided on account of the great immediate expence with which it is attended, and in some situations it is altogether inadequate to the object in view. There are some soils that being chiefly composed of a stiff clay, possess so great a degree of tenacity as to retain water upon every trifling depression of their surface, till evaporation carries it off. It is in vain to attempt to drain such soils by hollow channels below ground, as the water will never be able to filtrate through the soil so as to reach the drain. In such situations, therefore,

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169 Land is rendered wet by rain or by springs.

170 Drains are open or hollow.

171 Hollow drains, when inapplicable.

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fore, open draining is the only mode that can be adopted for clearing the soil of surface water.

It also sometimes happens that on ordinary soils, hollow drains would speedily be rendered useless. This must take place where the admission of surface water cannot be avoided, and, from the figure of the adjoining lands, must be very greatly augmented in time of heavy rains. In such cases, a close or hollow drain would speedily be choked up by the sand, and soil brought down by sudden and violent torrents. In these situations, therefore, open drains can alone prove useful.

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Draining
of clay soils.

Soils formed of a tenacious clay can only be drained by being laid up properly in ridges which are high in the middle, and have furrows at each side for carrying off the water. The great art of preserving land of this description, therefore, free from superfluous moisture, consists of laying out every field in such a direction as that all the furrows between the ridges may have a gradual descent to a common ditch or drain for carrying off the water. Where at any particular spot the regularity of the descent is interrupted, cross furrows must be kept open with the same view. The ridges must also be laid up in such a form as to allow the water to descend from the summit in the middle to the furrows on each side. If the ridges, however, are too high in the centre, there will be a danger that in heavy rains the soil may be washed from the summit down into the furrows, which would produce the double evil of impoverishing the centre of every ridge, and of choking up the furrows, and rendering them unfit to drain the land.

The distinguished success of the Flemish husbandmen, and also of the farmers in the central counties of England where this kind of soil abounds, sufficiently demonstrates the practicability of preserving it in a due degree of dryness for the most valuable purposes of agriculture. In these English counties, and in Flanders, the general mode of drying land consists of ploughing it up in high and broad ridges, from 20 to 30, and even 40 feet wide, with the centre or crown three or four feet higher than the furrows. By attentively preserving the furrows in good order, and free from stagnating water, the land is kept in a dry state, and all kinds of crops flourish.

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Draining
in the Carse
of Gowrie.

The mode of ridging and cross-furrowing the clay soil of the Carse of Gowrie, Perthshire, has been thus described by George Paterfon, Esq. of Castlehuntingly in that county. There are certain large common drains which pass through the district in different directions, sufficiently capacious to receive the water drained from the fields by the ditches which surround them, and of such a level as to carry it clear off, and to empty their contents into the river Tay. There are also ditches which surround every farm, or pass through them as their situation may require, but in such manner as to communicate with every field upon the farm. These ditches are made from two to four feet wide at top, and from one and a half to one foot at bottom; a shape which prevents their sides from falling in: but even then they must be cleaned and scoured every year at a considerable expence. If the fields be of an uniform level surface, the common furrows between the ridges, provided they be sufficiently deepened at their extremities, will serve to lay the grounds dry;

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but, as it seldom happens that any field is so completely free of inequalities, the last operation, after it is sown and harrowed in, is to draw a furrow with the plough through every hollow in the field which lies in such a direction, that it can be guided through them, so as to make a free communication with any of the ditches which surround the farm, or with any of the furrows between the ridges which may serve as a conductor to carry the water off to the surrounding ditches. When this track is once opened with the plough, it is widened, cleared out, and so shaped with the spade, that it may run no risk of filling up. Its width is from six inches to a foot according to its depth, which must depend upon the level of the field; but the breadth of a spade at bottom is a good general rule. It frequently happens that there are inequalities in several parts of the same field which, do not extend across it, or which do not pass through it in any direction that a plough can follow; but which may extend over two ridges, or one ridge, or even part of a ridge. Such require an open communication to be made with any furrow, which may serve as a conductor to carry off the water, which is always made with the spade. All these open communications are here called *gaas*, and to keep them perfectly clear is a very essential object of every Carse farmer's attention.

It is the general practice in the Carse to have head-ridges, as they are called, at the two extremities of each field; that is, the ground upon which the plough turns, is laid up as a cross ridge higher in the middle and falling off at each side, so that a *gaa* is made in the course of the inner furrow with which the whole furrows between the longitudinal ridges communicate, and into which they pour all their surface water, which is carried off by *gaas* or openings cut through the head ridges, and emptied into the adjoining ditches which convey the water to the main drain. Besides all this an experienced Carse farmer takes care that his lands be carefully ploughed, and laid up equally without inequalities that can hold water, and that the ridges be gradually rounded, so that the surface water may neither lodge nor run so rapidly off as to injure the equal fertility of the field.

With regard to the general rule for making open drains, it may be observed, that their depth and wide-ness must always in some measure be left to the judgment of each particular husbandman, that they may be varied according to the variety of soils and situations. Upon the whole, however, the width at bottom ought to be one-third of that at top, that, by being sufficiently sloped, the sides may be in no danger of falling in. The fall or declivity also should be such as may carry off the water without stagnation, and along with it any grass and other loose and light substances that may get into the ditch. At the same time, care ought to be taken to lead the drain in such a direction down any steep declivity that may occur in an oblique manner, that the water may not have too rapid a motion, as it would otherwise be apt to form inequalities in the bottom, and to wear down the sides. In moss and very soft soils drains require to be of considerable width, on account of their tendency to fill up; and their breadth at top must exceed that at the bottom in a greater degree than the proportion already mentioned. In all cases in which a ditch is intended for a drain only, and

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Preparation and not to be used as a fence, none of the earth thrown out of it ought to be allowed to remain upon the sides, but should be spread abroad upon the land, or used in filling up the nearest holes. When this is not done, the utility of the drain is injured by the surface water being prevented from reaching it, and by the tendency which this weight of earth has to cause the sides to fall in; the difficulty of scouring or cleaning it is thus also much increased. If it be necessary, however, to use the ditch, and the earth thrown out of it, as a fence, a deep furrow ought to be made along the back of the mound of earth, with openings in convenient places into the ditch for transmitting to it the water collected in the furrow.

In plantations, open drains are the only kind that can be used, as the roots of the trees would be apt to choke up covered drains. In pastures, small and narrow open cuts, made with the plough or otherwise, are often extremely useful, to carry off stagnating water and a part of the rain as it falls. The only objection to them is, that they are easily stopped by the trampling of the cattle; but, on the other hand, they are easily restored. Concerning all open drains, indeed, it must be remembered, that they require to be cleaned out at least once a-year; and when this process is neglected for any length of time, it becomes more difficult, and the drains lose their effect. Hence, though open drains are originally cheaper, yet, by the necessity of annual repairs, they sometimes become ultimately more expensive than covered or hollow drains, to the consideration of which we shall next proceed.

175 Nature and history of hollow drains. Hollow drains, in which the water is allowed to flow along a bed of loose stones, or other porous materials, while they are covered with a bed of earth in which the operations of the plough can proceed, bear a near resemblance to that part of the constitution of nature by which water flows in various channels along beds of porous strata in the bowels of the earth, and coming to the surface in various situations, supplies springs and the constant flow of rivulets and of the largest streams. The practice of hollow draining was known in a very remote antiquity. It is said that the present Persians are supplied by means of hollow drains with water in their most fertile fields, though they know not from whence the water is brought, and are unacquainted with the arts by which a more ingenious people in former times contrived to deprive one part of the soil of its superfluous moisture with a view to enrich another. The ancient Roman writers, Cato, Palladius, Columella, and Pliny, particularly mention the practice of hollow draining. They knew the kind of soils in which these drains are useful, and the propriety of directing them obliquely across the slope of the field. They filled them half way up with small stones, and for want of these with willow poles, or even with any coarse twigs or other similar materials twisted into a rope. They also fortified the heads of their drains with large stones, and their mouths or outlets with a regular building; and they carried the whole drain to the depth of three or four feet.

As already mentioned, hollow drains are of little value in a soil that consists of a stiff clay, and are chiefly useful where, from whatever cause the wetness may result, the soil is sufficiently porous to allow the moisture to percolate to an internal drain.

If the field proposed to be drained lie on a declivity, great care should be taken to make hollow drains in a direction sufficiently horizontal to prevent a too rapid fall of the water, which might wear the bottom uneven, and have the effect to choak, or, as it is sometimes called, to *blow up* the drain, whereby in certain spots in the field artificial springs would be formed.

Concerning the season for executing drains, discordant opinions are entertained. Some prefer winter, others summer. Where much work is to be accomplished, a choice of seasons may not indeed be left to the husbandman. Some farmers, however, when they have the choice of time, always prefer summer for this employment, being then able to execute the cuts in a neater manner without that kneading of the soil which takes place in winter, which they think hurts the usefulness of the drain, by ever after preventing the water from easily finding its way to it; besides, that it is easier to bring the stones or other materials to the spot in summer than in winter. Others, however, prefer draining in winter, because in the case of a clay soil the labour is at that season much easier; and also because labourers are then usually most easy to be obtained.

The depth and width usually adopted for hollow draining is very various, according to the nature of the soil and the situation of the field. When the practice first came into general use, three feet is said to have been the common depth; but, for many years past, it is said that hollow drains seldom exceed 30 or 32 inches, and that more drains are of two feet, or 26 inches deep, than of any other. One general rule, however, cannot be neglected with safety, that the depth must be sufficient to prevent the materials with which the drain is filled from being affected by the feet of horses in a furrow while ploughing; twenty-four inches is perhaps too little for this purpose. A horse's foot in a furrow is usually at the depth of four inches or more. If ten inches additional be allowed for the materials employed in filling the drain, there will remain only nine or ten inches to support the foot of a horse exerting his strength in the act of ploughing, which upon a porous soil seems scarcely sufficient. What are called *main drains*, which are those intended to receive the water of several other drains, must always be somewhat deeper than the rest, having more water to convey. As to the wideness of hollow drains, most farmers have of late been solicitous to render them as narrow as possible, because by this means a great saving takes place of the materials used for filling them. If the stones are coupled at the bottom of the drain, that is, made to lean towards each other, so as to constitute a triangle, of which the bottom of the drain forms the base, the width need not be greater than one foot; nor perhaps is it even necessary to exceed this breadth where large stones are thrown in promiscuously. That the ditches or cuts which are meant to be converted into hollow drains may be executed with neatness and care, a point of much importance to their usefulness, it is thought prudent that the workmen should not be paid according to the extent of ground which they open, but as day labourers. This, however, is more particularly the case with regard to filling the drains, an operation in which a still greater degree of attention is necessary.

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be filled.

The materials used for filling drains have been various, according to the substances which different farmers have been able to obtain. Stones, however, are the most common, and also the best of all materials, on account of their permanency. If stones from quarries are to be used, and the drain formed like a conduit at the bottom, the trench must be made at the lowest part 16 inches wide, containing two side stones about six inches asunder, and the same in height, with a cap or flat stone laid over, which secures the cavity. Such hollow drains are commonly used for permanent currents of water from springs, and are more expensive than where no such steady current exists, and the stones are either thrown in promiscuously, or laid down so as to form triangular cavities. Small stones, however, ought not to be used for the bottom of a drain. Whether the stones are large or small, they ought to be very clean, having no clay or earth adhering to them, and of the most hard and permanent quality that can be procured, with as little tendency as possible to moulder or decay in consequence of alternate changes from wet to dry. They ought also to be laid in carefully, so as not to tumble down any earth, which might choke up their interstices. The whole subject, however, will be better understood by a statement of the way in which drains have been filled with success by intelligent persons.

The following directions are given by T. B. Bayley, Esq. of Hope, near Manchester: "First make the main drains down the slope or fall of the field. When the land is very wet, or has not much fall, there should in general be two of these to a statute acre; for the shorter the narrow drains are, the less liable they will be to accidents. The width of the trench for the main drains should be 30 inches at top, but the width at the bottom must be regulated by the nature and size of the materials intended to be used. If the drain is to be made of bricks, 10 inches long, 3 inches thick, and 4 inches in breadth, then the bottom of the drain must be 12 inches; but if the common sale bricks are used, then the bottom must be proportionably contracted. In both cases there must be an interstice of one inch between the bottom brick and the sides of the trench, and the vacuity must be filled up with straw, rushes, or loose mould. For the purpose of making these drains, I order my bricks to be moulded 10 inches long, 4 broad, and 3 thick; which dimensions always make the best drain."

The method which this gentleman pursues in constructing his main drains is stated by him to be the following: When the ground is soft and spongy, the bottom of the drain is laid with bricks placed across. On these, on each side, two bricks are laid flat, one upon the other, forming a drain six inches high, and four broad, which is covered with bricks laid flat.—When the bottom of the trench is found to be a firm and solid body, such as clay or marl, he formerly thought that it might not be necessary to lay the bottom with brick; but in this he has candidly acknowledged that he was quite wrong. By the runs of water, the alternate changes from wet to dry, and the access of air, these hard bottoms were rendered friable, crumbled away, and let in all the drains, and allowed them to choke up, that were not supported by a bottom laid with brick or stone. When stones are used instead of bricks, Mr Bayley thinks that the bot-

tom of the drain should be about eight inches in width; and in all cases the bottom of main drains ought to be sunk four inches below the level of the narrow ones, whose contents they receive, even at the point where the latter fall into them.

The main drains should be kept open or uncovered till the narrow ones are begun from them, after which they may be finished; but before the earth is returned upon the stones or bricks, it is advisable to throw in straw, rushes, or brushwood, to increase the freedom of the drain. The small narrow drains should be cut at the distance of 16 or 18 feet from each other, and should fall into the main drain at very acute angles, to prevent any stoppage. At the point where they fall in, and 8 or 10 inches above it, they should be made firm with brick or stone. These drains should be 19 inches wide at the top, and 16 at bottom.

A mode of draining clay soils wet by rain or surface water, practised by Sir Henry Fletcher, Bart. with great success, seems worthy of being here stated. The upper soil is of good quality, but being situated in a mountainous part of the country, the frequent rains kept the upper soil so full of water, that it produced only a coarse grass worth 3s. per acre. The inferior soil of clay was of great depth. The mode of draining which has been successfully practised upon it is the following: "On grass lands he digs 22 inches, or 2 feet deep; the first spadeful is of the turf, taken so deep, as where it separates from the clay, which is dug carefully out, and preserved unbroken grass side up, and laid on one side of the cut; then, with a very strong spade, 18 inches long, 6 inches wide at top, and 2 at the bottom, he digs a spadeful in the clay, which the men spread about the land, on the side of the drain opposite to where the turfs were laid, as far as possible from the drain, so as none may get in again. A scoop, to clear out the fragments in the bottom, follows, which are also spread in like manner. They are then ready for filling; and in doing this, he takes three stones of a thin flat form, two of which are placed against the sides of the drain, meeting at bottom; and the third caps the other two. Thus, a hollow triangular space is left to convey the water, which is subject to no accidents that can fill it up or impede the current. Stones always sink deeper in the ground; and in the common method, this frequently causes stoppages by their being partly buried in the clay: but the triangle, when it subsides, does it regularly, and keeps its form and the passage for the water clear. One cart-load of stones, in this way, will do a considerable length of drain. They are carefully laid down by the side of the cut, with a shovel or basket, and if there are any small refuse stones left on the ground after the drain is set, they are thrown in above. The stones being thus fixed, the sods are then trimmed to the shape of the drain, and laid on them, with the grass side downwards, and none of the clay used in filling up.

The expence is a halfpenny per yard, the men earning 2s. and 2s. 6d. per day, at 10 yards distance from drain to drain. At 6 yards distance they answered well, but would not operate a cure, if more than 7 yards asunder. At this last distance, therefore, the expence of draining an English acre, at $\frac{1}{4}$ per yard, would amount to 1l. 9s. 2d. the stones being not more than half a mile distant.

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Not only stones and bricks, but also wood and other materials have been used for filling drains. Upon this point, Lord Petre expresses himself thus: "The drains filled with wood, and covered as usual with straw or rushes, are preferable to stones or any other kind of materials; the reason is, as the wood decays, the water continues to pass. When filled with stones, and the drains stop up, which must be expected to take place in time, the earth becomes quite solid round the stones, and as they do not decay, the filtering of the water is for ever obstructed: not so when bushes or wood are used; continual filtering and draining are then for ever to be perceived; and by repeating the operation a second time, cutting the drains transversely of the old ones, the benefit of the filterings through the rotten wood is secured, and the spewing up of old, broken, and damaged drains corrected and carried off. Moreover, as bushes form a much greater number of cavities than either stones or poles, they are less liable to stop up, and encourage filtering more than larger and more solid bodies. A load of bushes containing 120 faggots, will do about 360 rods; and a load of straw containing 120 bottles, the same: the load of bushes is generally worth about 14s. and the straw 18s. per load. I therefore calculate this expence about 12s. per acre, ditches a rod apart."

Richard Preston, Esq. of Blackmore, prefers, on twenty years experience, black thorns to every other material for filling drains. Wood is sometimes used with this view, in the following manner: Two billets are placed at opposite sides of the drain, and each is made to rest upon the opposite side to that on which its lower part stands, so as to form with each other a St. Andrew's cross. The upper part of the cross is filled with brushwood, laid longitudinally, above which straw is placed cross-ways, and the mould is thrown in over all. This kind of drain is said to have continued running in Berwickshire for 30 years, and it is recommended by the author of the Agricultural Report of the county of Caermarthen, in Wales. He says, "The completest method I have yet known, is to cut the strongest willows, or other aquatic brushwood, into lengths of about 20 inches, and place them alternately in the drain, with one end against one side of the bottom, and the other leaning against the opposite side. Having placed the strong wood in this manner, I fill the space left between them on the upper side with the small brushwood, upon which a few rushes or straw being laid, as before mentioned, the work is done. Willow, alder, asp, or beech boughs, are exceedingly durable if put into the drain green, or before the sap is dried; but if they are suffered to become dry, and then laid under ground, a rapid decay is the consequence. I have seen willow taken out of a bog, after lying there thirty years, and its bark was as fresh and sappy as if it had been recently cut from the hedge; and it is well known that beech laid green in the water will continue sound for any length of time."

Another method of using wood consists of fixing at every foot distance in the drain, a stick in the form of a semicircular arch, and of laying upon these longer branches or twigs longitudinally. Thus is a curved cavity, or arch, formed beneath, capable of supporting any weight of earth. For this purpose young wood is recommended, and in particular the prunings of larch.

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Instead of wood or stone, in many places, it has of late become customary to fill the lowest part of drains with straw, and with that view to make use of wheat stubble as the cheapest kind of straw. On this subject, Mr Vancouver, in his Report of the Essex husbandry, remarks, that when the soil is a very close and retentive clay, the drains should be made proportionally near to each other, shallow, and filled with straw only; it being totally unnecessary to use wood or any more durable material upon land where the sides of the drains are not likely to crumble in. He asserts that drains formed in this manner, through the tough and retentive clays, will be found in a short time after the work is finished, to afford over the straw, with which the drain was filled, an arch of sufficient strength to support the incumbent weight of the soil, and the casual traffic of the field. "In 12 or 18 months it may be observed that the straw, being of one uniform substance, is all rotted, and carried away, leaving a clear pipe through the land in every drain, into which the passage of the water may have been much facilitated, by a due attention to the filling of the drains with the most friable and porous parts of the surface the field might have afforded."

An improvement in filling hollow drains with straw, consists of twisting the straw into a rope, said to have been devised by Mr Bedwell, of Essex. The rope of straw is formed as large as a man's arm, and is placed at the bottom of the drain. The expence of draining an English acre of land with this material in Essex, is said to stand thus:

| | | | | | |
|---|---|---|-------|----|---|
| For cutting and raking together an acre of wheat stubble, generally sufficient for an acre of drains, | - | - | L. 0 | 2 | 0 |
| Digging eight score rods of drains, | - | - | 0 | 13 | 4 |
| Filling them up with stubble, | - | - | 0 | 2 | 8 |
| Extra work with the common spade, on an average a day's work for a man, | - | - | 0 | 1 | 4 |
| | | | <hr/> | | |
| | | | L. 0 | 19 | 4 |

As in some situations it is an object of great importance to save the expence of materials commonly used in filling drains, a variety of devices have with that view been adopted. One of these is of the following nature. A drain is first dug to the necessary depth, narrow at bottom. Into the trench is laid a smooth tree, or cylindrical piece of wood, 12 feet long, 6 inches diameter at the one end, and 5 at the other, having a ring fastened into the thickest end. After strewing a little sand upon the upper side of the tree, the clay or toughest part of the contents of the trench, is first thrown in upon it, and thereafter the remainder of the earth is fully trod down. By means of a rope through the ring the tree is then drawn out to within a foot or two of the small or hinder end, and the same operation is repeated till the whole drain is complete. Such a drain is said to have conducted a small run of water a considerable way under ground for more than 20 years without any sign of failure.

What is called the sod or pipe drain consists of a trench dug to a proper depth; after which a last spade-sod, or pipe drains. ¹⁷⁶ is taken out in such a way as to leave a narrow channel, which can be covered by a sod or turf dug in grass land and laid over it, the grass side downwards. Such drains

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drains are said to continue hollow, and to discharge well for a great number of years. Mosses are said to be drained in Lancashire nearly in the same manner, by leaving shoulders about a foot and a half from the bottom of the trench, and laying across these pieces of dried peat or turf, cut into lengths of 16 inches, and 8 or 9 inches in breadth.

In Buckinghamshire, in grass lands, the sod drain is thus made: When the line of drain is marked out, a sod in form of a wedge is cut, the grass side being the narrowest, and the sods being from 12 to 18 inches in length. The drain is then cut to the depth required, but is contracted to a very narrow bottom. The sods are then set in with the grass side downwards, and pressed as far as they will go. As the figure of the drain does not suffer them to go to the bottom, a cavity is left, which serves as a water course; and the space above is filled with the earth thrown out.

Another invention for draining land is described in the agricultural report of the county of Essex. It consists of a draining wheel of cast iron, that weighs about 4 cwt. It is 4 feet in diameter, the cutting edge or extremity of the circumference of the wheel is half an inch thick, and it increases in thickness towards the centre. At 15 inches deep it will cut a drain, one half of an inch wide at the bottom, and 4 inches wide at the top. The wheel is so placed in a frame, that it may be loaded at pleasure, and made to operate to a greater or less depth, according to the resistance made by the ground. It is used, in winter, when the soil is soft; and the wheel tracks are either immediately filled with straw ropes and lightly covered over with earth, or they are left to crack wider and deeper till the ensuing summer; after which the fissures are filled with ropes of straw or of twisted twigs, and lightly covered with the most porous earth that is at hand. Thus, upon grass or ley lands, hollow drains are formed at a trifling expence, which answer extremely well. It is said that 12 acres may be fully gone over with this draining wheel in one day, so as to make cuts at all necessary distances.

On sheep pastures a still simpler mode of removing surface water is said to be practised in some places. Wherever the water is apt to stagnate, a deep furrow is turned up with a stout plough. Thereafter, a man with a spade pares off the loose soil from the inverted sod, and scatters it over the field, or casts it into hollow places. The sod thus pared and rendered thin, is brought to the thickness of about three inches, is restored to its original situation, with the grassy side uppermost, as if no furrow had been made. A pipe or opening is thus formed beneath it two or three inches deep in the bottom of the furrow, which is sufficient to discharge a considerable quantity of surface water which readily sinks into it. These furrows, indeed, are easily choked up by any pressure, or by the growth of the roots of the grass; but they are also easily restored, and no surface is lost by means of them.

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With regard to the duration of hollow drains, or the length of time that the water will continue to flow in them, and thereby to preserve the soil in a proper state of dryness, it must necessarily depend, in a great degree, upon the nature of the materials with which they are filled, and the care that has been taken to prevent their being choked up by any accession of soft

soil. Independent of this last circumstance, a drain filled with stones, like the channel which supplies a natural spring, may endure for ever. Wood, with which many drains have of late years been filled, perishes at certain periods according to its nature; but it does by no means follow, that the drain should lose its effect in consequence of the destruction of the wood. If the earth over it form itself into an arch, the water will still continue to flow. Accordingly, it is said, that drains filled with bushes and straw have been known to run well after 40 years.

Having thus stated the various modes that have been most successfully adopted for draining lands of a super-abundant moisture caused by rain or surface water, we shall proceed to consider the way in which a soil may be drained when its undue wetness is the consequence of natural springs, or of water arising out of the bowels of the earth; and also when the soil, whether injured by spring or rain water, is so completely surrounded by higher grounds, as to prevent the possibility, at a moderate expence, of obtaining a level by which the water may be conducted away, either by open or by artificial hollow drains.

To understand the principles upon which land, rendered wet by springs, may be drained for the purposes of agriculture, it is necessary to attend to the materials of which the globe we inhabit is composed, and to the manner in which large quantities of water find their way into its bowels. The earth upon which we tread is by no means an uniform mass of matter. It consists of various layers or strata of different substances, one placed over the other. These layers or strata are seldom situated horizontally, but almost always descend towards one side or the other. One part of a stratum or layer often ascends and appears on the surface, while the other end or side of it descends obliquely to a great depth into the earth. Having done so, it frequently again bends upwards towards the surface; and indeed assumes almost all the variety of irregular forms and bearings that the imagination can conceive; sometimes suddenly breaking off and giving place to other strata or layers, and sometimes continuing at one corner while the greater part of it ceases. These strata or layers, of which the earth is composed, may be considered, with a view to the explanation of our present subject, as of two kinds. Some of them are porous, and allow water to pass through their substance, and to fill up all their cavities and interstices, such as sand, gravel, some marls, and various kinds of porous rocks. Other layers, on the contrary, do not suffer water to enter into them; such as clay, or gravel with much clay mixed with it, and rocks of a close and compact nature, without any fissures or clefts in them.

It is next to be remarked, that it is chiefly upon high mountains that water exists, or is formed, in very great abundance. Not only do they catch and break the passing clouds, which deposit upon them the greatest portion of their watery contents, but they would seem to have a power, when neither rain nor clouds appear in the sky, of condensing, attracting, or somehow forming water from the atmosphere. In the great burning deserts of Africa rain is scarcely known. The inhabitants build their houses of clods of earth or of lumps of salt. A drizzling shower, which is apt to come once in several years, endangers every dwelling; and

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Preparation and two hours of heavy rain would lay a whole city in ruins; yet even there, wherever mountains exist, that is to say, naked rocks, which abound in a few districts of this wilderness, water is almost always found in their vicinity; and, in consequence of the water, spots covered with the most luxuriant verdure are seen like islands amidst the dreary tracts of moveable and unproductive sand.

The upper part of mountains is very frequently covered with a layer of gravel, or loose and open rock, into which water readily penetrates. These porous layers or strata descend gradually into the bowels of the earth, and convey along with them the water which they contain, and have received from the clouds. Under the porous stratum or layer of gravel are usually layers of clay or of solid rock, through which the water cannot pass, but along the upper part of which it flows. After descending, however, a certain length obliquely down towards the plain country, layers or strata of clay and other impervious materials usually come to be placed above the layers of porous gravel. Thus, as the water in the gravel is confined between clay above and clay or rock below, and must descend along the gravelly channel which is pervious to it, streams of water are formed in the bowels of the earth, which have their origin in high gravelly soils, and their outlets at any place in the low country, where any part of the beds of gravel or porous rock, along which they flow, happens to approach the surface, forming springs and rivulets, and, by their union or conflux, mighty rivers, which continue steadily to water the surface of earth. Hence also, in very many situations, by digging pits into the earth, we at last reach a layer of pervious gravel or rock, containing a stream of water brought, perhaps, from the summit of a distant mountain; and such pits can be used as wells for supplying water for every domestic purpose.

We have said that the upper part of the face of a mountain is often covered with a bed of porous or gravelly substances capable of taking in water. Upon the surface, at a certain distance down the hill, a bed of clay begins. The water received above into the layer of gravel continues to descend with that layer for a considerable space below the bed of clay; and thereafter the gravel suddenly stops, and the clay above unites with the clay beneath, or with some other impervious strata upon which the gravel all the way rested. In this situation, as the water contained in the gravel can proceed no farther, it hangs within the side of the hill as in a bag of clay; and a reservoir is formed of water within the earth. When this bag or natural reservoir is full, the water contained in it is pressed upwards against the clay by which it is covered. It moistens this clay, and finds its way by chinks through all its weaker parts or pores. Thus a belt of soft and spouty land is formed upon the side of the hill; the mode of draining which is very easy. If a hole is dug into the earth near the bottom of the bag or reservoir of water, so as to reach the layer of gravel, the water will instantly flow freely out, and, being no longer restrained, it will cease to press upon the layer or stratum of clay that covers it, or to force a passage through its chinks; and the soil will consequently be drained.

Let it be supposed, that the porous stratum or layer

of gravel, instead of stopping on the side of a hill, descends into the plain or level country, the water all the while passing along in its bowels; and that the gravel has a layer of clay below and another layer of clay above it. After it has reached and passed to a considerable distance along the valley, if the layer of gravel either suddenly stop and allow the layers of clay to come together, or if the gravel have too little thickness and capacity to allow the water which flows within it to pass easily along, it will necessarily, from the new supplies of water which are continually descending, be pressed upwards against the layer of clay which covers it: as in the former case, the clay will be softened, and the water will filtrate through all its weaker parts till it reach the surface, which it will keep constantly wet, and where it will stagnate in consequence of the flat and level form of the country. Over the softest places, a coarse verdure will spread, and the roots of the plants intertwining, will form shaking quagmires. In other places, the moss plants, being the only ones which can thrive in the moist and ungenial soil which is thus produced, will rapidly spring up, and a moss will be formed altogether unfit for any purpose of agriculture. To drain such a soil, it is evidently only necessary to dig a pit or hole through the upper stratum of clay into the gravel, to give a free vent or issue to the water; which having thus found an easy passage to the open air, will cease to press upon the incumbent layer of clay, or to render it moist. This clay will therefore speedily become dry and collapse; the moss plants will wither, provided the surface is properly drained; and the whole soil will become solid and fit to be cultivated.

It sometimes happens, as already noticed, that a piece of territory which lies low, is rendered extremely wet by rain and spring water coming from adjacent high grounds, and lodging upon its surface, while, at the same time, it is so completely surrounded by eminences, or land-locked, that it cannot be drained at a moderate cost; the consequence of which is, that the water stagnates, and a moss or bog is formed. The principles which we have already stated concerning the manner in which the globe is made up of various strata, indicate the way in which such a bog may be drained at a cheap rate. It is only necessary to dig a pit at the lowest part of it, down through the clay, or other impervious layer that holds up the water, till a porous stratum is reached capable of conveying away the surface water down the country below ground to the sea, or to such rivers as it may chance to be connected with.

The whole art of draining land where the wetness is occasioned by water pressing upwards from the bowels of the earth, depends upon these principles. It is an art whose importance is not yet sufficiently appreciated, because imperfectly understood, and because it has not yet been carried in practice to its full extent. It is probable, however, that at no remote period it will be held in universal estimation, on account of the command of those hidden streams that are contained in the bowels of the earth, which it will give to mankind for the purposes of an improved agriculture, and for the service of commerce in filling canals and giving motion to every kind of machinery. A dispute exists about the original discovery of this art. The celebrated writer upon agriculture, Dr James Anderson of Aber-

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dean, in his "Essays on Agriculture and Rural Affairs," published in 1775, was undoubtedly the first person who explained to the world the nature of the art of draining land rendered wet by springs, and the principles upon which it ought to proceed; having been led to the investigation many years before, by his having fortunately succeeded in draining a bog by sinking a pit in it through the clay till an opening was made into the gravel or porous stratum, from which the water rushed up vehemently. In the mean while, it had happened that Mr Joseph Elkington, possessor of a farm in England called Princethorpe, in the parish of Stretton upon Dunsmore, and county of Warwick, almost as early as Dr Anderson, had accidentally discovered that land might be drained in many situations by making a small hole into the earth. Being a man of considerable natural ingenuity, though, it is said, of little literature, he had the address to take advantage of the discovery he had made, with a view to the improvement of his affairs. He therefore commenced the trade of a drainer of lands; and by the novelty of draining land by a small hole bored often at a considerable distance from the wettest part of it, and by conducting himself in a mysterious manner, he acquired great reputation, and was extensively employed. This employment he appears to have merited, as his operations were attended with very great success. After the establishment of the Board of Agriculture, its members, who appear to have been unacquainted with Dr Anderson's publication, supposed Mr Elkington to be the only discoverer and possessor of the art of draining land wet by springs in the way now mentioned; and upon their recommendation, parliament bestowed a reward of 1000l. upon him. It was surely an unfortunate circumstance, that the first premium granted upon the recommendation of this board, should have proceeded upon an error, as it undoubtedly did; for, although Mr Elkington had the merit of being the first who introduced this art extensively into practice, there is no doubt that Dr Anderson, by whom also it was discovered, was the first who explained its principles to the public, and that at a period when Mr Elkington's secret remained with himself. After all, however, it is not to be supposed that the theory of this art was absolutely unknown, although these persons appear to have been the first who proposed to apply it extensively to the purposes of agriculture. It is said that the practice is very ancient in Italy, when a well is dug, to avoid the expence of going to a great depth, by boring with an auger in the bottom of the pit, in the hope of reaching the porous stratum which contains the water. And in Germany it appears, as will be afterwards noticed, that the practice has long existed of draining landlocked bogs, by letting down the water by means of a pit through the impervious clay, to a porous substratum. We shall now proceed to state the most approved modes of draining land that is rendered wet by springs, or water ascending out of the earth; and as the Board of Agriculture instructed Mr John Johnston, land surveyor, to inspect Mr Elkington's principal drainings of this sort, and to give an account of them, we shall give all due attention to the contents of the report made out by that gentleman, which is understood to have been executed with much fidelity and accuracy;

though we shall also exhibit, at the same time, the practice of other intelligent persons upon the same subject.

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In the practice of this art it will readily occur, that it is of the utmost importance to obtain a knowledge of the internal structure of the earth, and of the manner in which its various layers or strata succeed, and are usually intermingled with each other. This object, however, can only be attained in any considerable degree of perfection by observation and experience. There are several ways, however, by which a man of sagacity and reflection may greatly abridge the difficulty of this study, so as in a short time to enable himself to practise the art of draining with considerable success. The surest way of ascertaining the inclination of the different strata, or the way in which they lie upon each other, and the direction in which they descend into the earth, consists of examining the bed of the nearest rivers, and the appearance of their banks when steep and broken, so as to lay bare the different strata of earth adjoining to them. Pits, quarries, and wells, that may have been dug in the neighbourhood, may also be examined with the same view. Rushes, small elder bushes, and other plants which grow on the wettest soils, also frequently afford symptoms of the line under which an internal reservoir of water is placed, and is pressing upwards from wanting a free passage below ground.

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Practical
rules for
draining
land made
wet by
springs.

It is often of much importance, even in sheep countries, to drain the side of a hill, not only because wet land is more unproductive than that which is properly drained, but because the superabundance of moisture is apt to introduce and to keep up among the flock that destructive and incurable disease, the *rot*, for which draining is an almost infallible preventive. It is cheaply executed in such situations, because the drains for collecting and leading off the water, may usually be left uncovered. Let it be supposed then, that in consequence of internal springs at a certain distance down the declivity of a hill, or upon any other descending surface, the ground becomes wet and spouty, and unwholesome for sheep, and unfit for agriculture; the best mode of proceeding with a view to drain it is this. It ought to be recollected, that the reason of the wetness is this: The rain water at the summit of the high ground is received into a porous stratum of gravel, with which it descends down the side of the hill, till it comes to be covered with a clayey soil. After descending under the covering of clay to some distance, the gravel or porous under soil suddenly ceases; the clay becomes deeper, and touches the rock or another inferior bed of clay. In this situation, the water, unable to descend farther, regorges and presses upwards upon the clayey soil which covers it, rendering it moist and swampy in every part, and oozing through all its weaker crannies. Thus it forms a belt of moist ground along the face of the hill, from which the water perhaps descends and damages every part. To drain this declivity, begin at the bottom and carry up a ditch towards the wet ground. As the object is to let out the water at the lowest point of the reservoir or natural bag in which it is contained, by making an opening into the gravel there, it will be proper, as the ditch proceeds upwards, frequently to bore holes with an auger of about two inches diameter to a considerable depth,

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To drain
the side of
a hill.

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depth, that is, about 15 feet, though sometimes it is necessary to go to twice that depth. As long as the water is not found by boring, the ditch must be carried upwards, and new auger holes formed; when at last the auger by boring reaches the lowest part of the gravel or reservoir of water, the water will immediately rush forth with considerable violence at the hole formed by it, and will continue ever after to run without any danger of choking up. When the bottom of the reservoir of water or layer of gravel is thus found, another ditch ought to be drawn across the head of the former along the face of the hill, so as to form the figure of the letter T. In the upper ditch or drain that runs along the face of the hill, auger holes ought to be bored at short distances, to let out the whole water from the interior reservoir or stratum of gravel. The whole process will be easily understood from considering the figure 3. Care ought always to be taken in digging the upper drain along the face of the hill, to form it in such a way as that the water may descend in it towards the ditch first formed, which is intended to convey it down the hill to the nearest brook. The old practice or mode of draining ground in this situation before the use of the auger was understood, and before men had reflected upon the way in which water is often confined in the earth, consisted of digging a trench wherever the spouty land commenced. As this was not deep enough to reach the evil, that is, to penetrate to the reservoir of water, it produced only a partial remedy. Other parallel ditches of the same kind were therefore cut the whole way down the declivity, and being filled with loose stones and connected with a descending ditch, each carried off only a portion of surface water, leaving the soil still cold in consequence of the wetness of the bottom.

Plate XII.

In performing the operation already described, some difficulties are apt to occur in consequence of the irregularities with which the strata are often placed in the earth. In boring in the ascending trench, in the first part of the operation, with a view to discover the lowest point at which the water may be let out from the internal reservoir, the operator is sometimes apt to be misled by finding water before he has come high enough to reach the place at which the porous stratum stops. This arises from its sometimes happening that at the bottom of the reservoir small leakages occur, and a portion of the water finds its way downwards through crannies in the earth to some distance from the main reservoir. When the auger in boring meets these leakages, they are apt to be mistaken for the main body of water, and the operator can only guard himself against such errors, by forming an estimate of the quantity of water which the adjoining high grounds ought to afford. If the quantity of water that follows the auger be very trifling while the extent of high ground is great, he may be assured that he has not yet reached the great cause of the wetness of the soil. It also sometimes happens that the cross drain carried along the face of the hill, may in some places be below the level of the reservoir of water, while it is upon it at other places. In this case, when the auger by boring in the cross trench brings no water, it will be necessary to bore above it, and to conduct the water that is there obtained by a small cut into the general cross trench.

It sometimes happens that hills are composed of al-

ternate strata, of rock and sand and clay, which rest horizontally or nearly so upon each other, and penetrate and form the mass of the hill. In such cases the soil above the sand or rock is often dry and productive, while the clay is wet and swampy. In this case, the highest part of the hill being generally porous, receives the rain water, which descends through it till it meets the impervious clay, which forces it to flow to the surface, which it renders wet. Having overflowed the upper clay surface, it is immediately absorbed by the next porous stratum; and descending into it in like manner, again issues at the lower side of it, and injures the surface of the next bed of clay, as it did that of the first. To drain a hill side of this description, it is necessary to make a trench along the upper side of every belt of rushy or boggy soil to receive the water from the superior porous soil, and to lead the whole water thus obtained by one or more ditches downwards to the bottom.

Where a soil is composed of intermixed varieties, with clay predominating, it is sometimes very difficult to drain, as it is apt to form itself into a variety of hollow reservoirs, each of which holds water like a cup, while, at the same time, these hollows being full of porous materials, the surface of the soil is sufficiently regular. Thus in wet seasons, patches of moist unwholesome soil are formed, not by springs for which they may be mistaken, but by rain water held up by clay in these disjointed cavities. They can only be drained by separate covered cuts, communicating in the shortest way possible with one or more main drains.

With regard to the drainage of bogs, it has already been remarked, that they are either such as can have their water carried off by a communication, at a tolerable expence, with some adjoining lower ground; or they are land-locked, so as not to admit of being drained in this way. With regard to the former, or those which can be drained by trenches for conducting the water to an adjoining low country or river, they may be rendered wet in two ways: 1st, By springs oozing out of the adjoining higher ground, in a regular line along the upper side of the wet surface, which afford water that stagnates upon the surface of the inferior ground, forming it into a bog. To render free from water a bog of this kind, nothing more is necessary than merely to drain the upper adjoining swampy ground in the way that has been already stated, and to convey away to a distance the water produced by it, in regular, open, or hollow drains.—The second class of bogs rendered wet by springs, consists of those in which the many springs that appear are not confined to one regular direction along the upper side, but burst out everywhere, forming shaking quagmires, over which it is dangerous for cattle to pass. The upper part of such bogs usually consists of peat-earth. Below that is found a bed of clay, extremely wet and soft, through the crannies of which small quantities of water are continually oozing. When the lowest part of such a bog is found, or the place in which it will be most convenient to convey away the water, little more is usually necessary than to dig proper trenches, and to bore with the auger through the stratum of clay to the porous stratum containing the water. To drain an extensive bog, it will usually be necessary to dig a trench from end to end of it, with cross trenches at considerable distances,

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To drain a bog by letting the water ascend freely.

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the bottom of the whole being frequently penetrated with the auger, so as to allow a free passage for the water to ascend; the effect of which will be, that the nature of the surrounding soft soil will speedily be altered, in consequence of the water being removed from beneath it. It will become dry and solid, and soon fit for bearing the plough. The same effect would follow although only a single perforation were made through the inferior stratum of the bog; and accordingly Mr Elkington is said sometimes to have succeeded, while he drained a bog, in raising the water from it considerably above its own level, for any purpose for which it may be required. This was done by rearing around the perforation, a building of brick, puddled around and within with clay, to the top of which the water rose, and was from thence conveyed away in pipes or otherwise.

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Dr Ander-
son's rules
for draining
spouty land.

That the whole of this important subject, of draining land rendered wet by springs, may be better understood, we shall give an account of it as described by Dr Anderson, in his Essays published in 1775, already mentioned. Supposing, says he, a descending stratum of sand or gravel should be discontinued, and that the stratum above it should be of a coherent clayey nature; in this case, the water being pent in on every side, and being accumulated in great quantities, must at length force a passage for itself in some way, and pressing strongly upon the upper surface, if any one part is weaker than the rest, it would burst forth, and form a spring; but if the texture of every part of this stratum were equally strong, the water would squeeze through many small crannies, and would ooze out in numberless places, so as to occasion that kind of wetness that is known by the name of a spouting clayey soil.

The cure in this case is easily effected.—For if a ditch of a considerable size is opened towards the lowermost part of the spouting ground, so deep as to penetrate through the upper stratum of clay, and reach to the gravel, the water will rise up through it at first with very great violence, which will gradually decrease as the pressure from the water behind is diminished; and when the whole of the water accumulated in the subterraneous reservoir is run off, there being no longer any pressure upon the clay above it, the whole soon becomes as dry as could be desired, and continues so ever afterwards, if the ditch is always kept open. This the doctor says he can assert from experience, having rendered some fields of this kind that were very wet quite dry by this method of treating them. The attentive observer, he adds, will readily perceive, that if any field that is wet from this cause admits of being ploughed, it will be in equal danger of being hurt by being raised into high ridges, with the other kind of damp ground before mentioned. For as the depth of earth above the reservoir would be smaller in the deep furrows than anywhere else, there would of consequence be less resistance to the water in that place, so that it would arise there in greater abundance. And if, in this case, a farmer should dig a drain in each furrow, as a considerable quantity of water would rise into them, in some cases the ground might be improved, or even quite drained thereby, especially if they should have accidentally reached the gravel in any one place; although at an expence much greater than was necessary. “I take notice of this circumstance, says he, in some measure to prevent the prejudice that some inattentive

observers might entertain against what was said before of this method of draining, against their having accidentally seen some fields that may have been bettered by it.

“Bogs are only a variety of this last-mentioned kind of wet ground; and, therefore, ought in general to be drained after the same manner with them. Clay is a substance that strongly resists the entrance of water into it: but when it is long drenched with it, it is, in process of time, in some measure dissolved thereby; loses its original firmness of texture and consistence; and becomes a sort of semi-fluid mass, which is called a bog; and as these are sometimes covered with a strong scurf of a particular kind of grass, with very matted roots, which is strong enough to bear a small weight without breaking, although it yields very much, it is in these circumstances called a *swaggle*. But, whatever be the nature of the bog, it is invariably occasioned by water being forced up through a bed of clay, as just now described, and dissolving or softening, if you will, a part thereof. I say only a part; because whatever may be the depth of the bog or swaggle, it generally has a partition of solid clay between it and the reservoir of water under it, from whence it originally proceeds: for if this were not the case, and the quantity of water were considerable, it would meet with no sufficient resistance from the bog, and would issue through it with violence, and carry the whole semi-fluid mass along with it. But this would more inevitably be the case, if there was a crust at the bottom of the bog, and if the crust should ever be broken, especially if the quantity of water under it were very considerable: and as it is probable, that, in many cases of this sort, the water slowly dissolves more and more of this under crust, I make no doubt but that, in the revolution of many ages, a great many eruptions of this kind may have happened, although they may not have been deemed of importance enough to have the history of them transmitted to posterity. Of this kind, although formed of a different substance, I consider the flow of the Solway moss in Northumberland to have been; which, upon the 16th of November 1771, burst its former boundaries, and poured forth a prodigious stream of semi-fluid matter, which in a short time covered several hundred acres of very fine arable ground. Nor will any one, who is acquainted with the nature of moss,—who knows its resemblance to clay in its quality of absorbing and retaining water, and its very easy diffusibility therein, be surpris'd at this; as from all these properties, it is much better adapted for forming an extensive bog, and therefore in greater danger of producing an extensive devastation by an irruption of the water into it, than those that are formed of any kind of clay whatever.

“If the bog, or swampy ground, is upon a declivity, the ditch ought to be carried across the field about the place where the lowest springs arise. But if the surface of the ground is level or nearly so, so as to form soft quagmires, interspersed through the whole of the field, it will be of little consequence in what part the drain is opened; for if it is dug up so deep as to allow the water to rise in it with freedom, it will issue through that opening, and the field will be left perfectly dry.

“But as it may frequently happen that the stratum of gravel should be at a considerable depth beneath the surface

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surface of the earth, and as it may be sometimes even below the level of the place into which the drain must be emptied, it might sometimes be extremely difficult to make a ditch so deep as to reach the bed of sand or gravel. But it is lucky for us that this is not absolutely necessary in the present case; as a drain of two or three feet deep, will be equally effectual with one that should go to the gravel. All that is necessary, in this case, is to sink pits in the course of the drain, at a moderate distance from one another, which go so deep as to reach the gravel; for as the water there meets with no resistance, it readily flows out at these openings, and is carried off by the drain without being forced up through the earth; so that the ground is left entirely dry ever after.

“I have likewise drained several fields in this way: and as I have generally found the appearances pretty much alike, I shall, for the information of the inexperienced reader, give a short account of them.

“If you attempt to make your pit in one of these soft quaggy places where the water is found in great abundance, you will meet with very great difficulty in forming it; for as the substance of which it is composed is soft, it will always flow into the hole as fast as you dig it; on which account I would advise, not to attempt to make the pit in the swaggle, but as near it in the solid earth as you conveniently can. However, if it is pretty firm, and of no great extent, it is sometimes practicable to make a pit in the soft bog at the driest time of the year. This I have sometimes practised, which gave me an opportunity of observing the nature of these bogs more perfectly than I otherwise would have had. In the trials of this kind that I have made, this soft quaggy ground has seldom been above three or four feet deep; below which I have always found a stratum of hard tough clay usually mixed with stones, and so firm that nothing but a mattock or pickaxe could penetrate it: and as this is comparatively so much drier than the ground above it, an inexperienced operator is very apt to imagine that this is the bottom that he is in search of. In digging through this stratum, you will frequently meet with small springs oozing out in all directions; some of them that might fill the tube of a small quill, and others so small as to be scarce perceptible: but without regarding these, you must continue to dig on without intermission till you come to the main body of the reservoir, if I may so call it, that is contained in the rock, gravel, or sand; which you will generally find from two to four feet below the bottom of the swaggle, and which you will be in no danger of mistaking when you come to it: for, if there has been no opening made before that in the field, as soon as you break the crust immediately above the gravel or rock, the water bursts forth like a torrent, and on some occasions rises like a *jet d'eau*, to a considerable height above the bottom of the ditch; and continues to flow off with great impetuosity for some time, till the pent-up water being drained off, the violent boiling up begins to subside, and the strength of the current to abate; and, in a short time, it flows gently out like any ordinary spring;—allowing it to remain in this state, the quaggy earth begins to subside, and gradually becomes firmer and firmer every day; so that, in the space of a few months, those bogs which were formerly so soft as

hardly to support the weight of a small dog, become so firm that oxen and horses may tread upon them without any danger of sinking, at the very wettest season of the year. I have had a field of this nature, that, by having only one such pit as I have now described opened in it, was entirely drained to the distance of above a hundred yards around it in every direction. But as it is possible that the stratum in which the water runs may be in some places interrupted, it will be in general expedient to make several of these pits, if the field is of great extent; always carrying the drain forward through the lowermost part of the field, or as near the quag as you conveniently can; and sinking a pit wherever you may judge it will be most necessary. But if the stratum of gravel is not interrupted, there will be no violent burst of water at opening any of these after the first, as I have frequently experienced. To keep these wells from closing up after they are made, it is always expedient to fill them up with small stones immediately after they are made, which ought to rise to the height of the bottom of the drain.

“I have often imagined that the expence of digging these pits might be saved by boring a hole through this solid stratum of clay with a large wimble made on purpose; but as I never experienced this, I cannot say whether or not it would answer the desired end exactly.

“If the whole field that is to be drained consists of one extensive bog, it will require a long time before the whole work can be entirely finished, as it will be impossible to open a drain through it till one part of it is first drained and become solid ground. In a situation of this kind, the undertaker, after having opened a drain to convey the water from the lowest part of the bog, must approach as near to the swampy ground as he can, and there make his first pit; which will drain off the water from the nearest parts of the bog. When this has continued open for some time, and that part of the bog is become so solid as to admit of being worked, let him continue the ditch as far forward through it as the situation it is in will admit of, and there sink another pit; and proceed gradually forward in the same manner; making cross cuts where necessary, till the whole be finished.

“In this manner may any bog or tract of spouting ground of this nature be rendered dry at a very inconsiderable expence; and as there can be no other method of draining ground of this sort effectually, I recommend the study of it to the attention of every diligent farmer who may have occasion for it. Let him first be extremely cautious in examining all the circumstances of his particular fields, that he may be certain which of the classes above enumerated it may be ranked with; and when he is perfectly sure of that, he may proceed without fear, being morally certain of success.

We shall add the substance of a paper on this subject, for which the author received the silver medal of the Society instituted for the encouragement of Arts, Manufactures, and Commerce. That author is Mr John Wedge of Bickenhill, near Coventry, who is not only a great farmer himself, but had likewise been employed by the earl of Aylesford in the management of several estates. Encouraged by his lordship's liberality, Mr Wedge informs the society, that he had

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mode of
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been employed for some years in draining large portions of land, of which part was in the earl's occupation, and part in his own, as tenant to his lordship. The principles upon which he proceeded, as well as his mode of procedure, he states in the following terms :

In every country there are large portions of land that, in wet seasons, have always what may be called a *dry surface*, and other portions of land that have always a *moist* or *wet surface*; the former of these admitting all the water which falls upon them to sink freely through their pores to various depths, till falling on clay, or some other unctuous earth, whose pores will not permit it to pass through, it is there held up to a height proportioned to the quantity of water which comes upon it, and the facility with which that water is discharged. Thus, held up to various heights, it serves as a fountain to distribute its water (either by veins of sand, pebbles, or rock, according to the formation of the different under strata) on the neighbouring lands; and there forms bogs and other varieties of wet surface, on a basis that will be always found to consist of marl or clay, or some mixture thereof. The effect of water thus distributed may be divided into two classes. The first class, where the water is thrown out by a body of marl or clay, &c. upon the surface of descending ground, and in the valley (there held up by clay also) forms bogs or swamps. The second class, where the water is held up by marl or clay, as before, having above that marl or clay a stratum of sand, or pebbles, through which the water passes; and above those sands or pebbles another stratum of marl or clay, through the weakest parts of which the water, by a continual pressure from its fountain, forces a passage upwards; and thus, through the weakest parts of the marl or clay, furnishes a continual supply of water on the surface, for the formation or growth of bogs, &c. in proportion as this water is more or less abundantly supplied by its fountain or head, namely, the higher lands, into which rain-water freely passes, as before described. There are also different soils, under different circumstances, which may form a third class of land for draining; such as strong deep soils, or open light soils, having near the surface a body of marl or clay. In either of these cases, the water which falls on the surface must, for reasons which are self-evident, keep such lands, in rainy seasons, constantly wet and cold; and it should be observed, that a mixture of all the three before-described classes of wet land sometimes occurs in one field, by sudden alterations of the under strata, and thereby perplexes the operator, by requiring all the different modes of draining in the same field.

If it be admitted that bogs are thus formed and fed, their cure may be effected with certainty: The first class, by cutting through the stratum (be it sand, pebbles, or rock,) that conveys the water to the bog, and carrying off that water by a close drain to some proper place, where the level admits of its discharge: The second class, by sinking a drain to any convenient depth in the upper clay; and then digging or boring with a large auger, at a small distance on one side of this drain, through the remaining part, be it (the upper clay) ever so deep, into the under stratum of sand, pebbles, or rock, through which the water passes; which will then rush up into the drain so made, with a velocity proportioned to the height of the land or fountain

whence it is supplied. As this drain advances through the land, holes must be dug or bored, as before, every seven yards, or at such distance as the strength of the springs may require; and the whole of the water thus brought up by tapping the springs, is carried off by the drain made in the upper clay, which must be a close one, to its proper level, and there discharged.

By both these methods of draining, large tracts of land, under favourable circumstances, may be cured with one drain. The best place for fixing these drains is where the stratum that conveys the water comes nearest to the surface; and the best method of ascertaining that, is to bore or dig in different parts through the different under strata.

The third class may be easily cured by close drains, at such distances and depths as will best carry off the surface-water. It may not be improper to observe, that where the different strata or measures crop out, that is, become gradually more and more shallow in some certain direction (as is often the case, till, one after the other, they all present themselves in succession on the surface of the earth), draining may often be much more easily and better effected by crossing with the drain the different strata or measures, where the levels and other circumstances will admit.

Some of the land drained was part of a common, in the parish of Church Bickenhill, in the county of Warwick; part of it was covered with moss and ling, had a peaty surface, about six inches deep, and produced little or no grass: in all wet seasons it was filled quite to the surface, and often overflowed, with water. Some of the land was much more unsound, deeper of peat, and covered with moss, in most parts nine inches long; another part was an absolute bog in all seasons.

Having dug or bored with a large auger into several parts of the land, Mr Wedge found peat, gravel, and sand mixed, and a quicksand almost uniformly. The quicksand in every part, after getting an inch or two into it, seemed almost as fluid as water. Judging from this, that no materials for a drain could be laid in the quicksand, but what it would immediately bury, he dug a trench almost to the quicksand, leaving gravel, &c. of sufficient strength to bear up the materials for a hollow drain; these materials were two sides and a coverer of stone, with a peat-turf on the top to keep out the soil. At every seven yards forward, by the side of this drain, he dug a hole in the quicksand as deep as it would permit. From these holes the water rose freely into the hollow drain, and was by it discharged at a proper level. It may be proper to remark, that the stone made use of for this drain, and all others here mentioned, was a red sand and rag-stone, which easily split into proper sizes for the purpose, and is very durable; it cost about sixpence per ton getting, exclusive of carriage. The drain thus formed ran on the whole rather freely, and made the land dry for a few yards on each side thereof, but was far from having the effect he improperly expected; for it evidently appears that the drain could only take a very small portion of the water from so large a quicksand, which it did not penetrate more than two inches; and that it could drain only to its own depth, or, at most, to that depth in the fountain which supplied the quicksand. His purpose was then defeated; and his motive for mentioning this error cannot, he hopes, be mistaken.

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He now did what he says he ought to have done before, that is, he examined the different strata to a greater depth, particularly on the bog, and at the upper edges thereof, and found the bog to be what has been described under the first class. He therefore determined to attempt the cure in the manner before prescribed for that class, namely, to cut through the whole of the stratum (in this instance, of quicksand), through which he found the water pass. This he effected as follows: The summer being dry, and favourable for the purpose, and having previously made his main open drain, he began his main close drain the first week in June 1791, three feet wide, on the declivity near the edge of the great bog. In the first operation he dug through the peat, the hard sand, and gravel and one spade's graft (about nine inches deep, and seven inches wide) into the quicksand the whole length of this drain, which was 73 perches, of eight yards to the perch, in length. The drain thus dug ran copiously, not less than 60 gallons per minute. In this state he left it about nine days: the effect of it was rapid, both above the drain and on the bog below. Upon examination, he now found about three inches on the top of the spade's graft, which had been made into the quicksand, perfectly dry. He then dug out these three inches of dry sand, to nearly the whole width of the drain, three feet; and at the same time dug out, as before, another spade's graft, from the top of the quicksand, as near the middle of the drain as possible. This was left to run a few days, as before, and had the same effect, namely, three or four inches more of the top of the quicksand became dry and hard. The same operation was repeated again and again with the same effect, till the purpose of getting through this quicksand was completed, so far at least as the level of the main open drain would permit. The stream of water continued increasing during the whole operation; the bog below the drain was quite dry, and the land above perfectly so. The drain which was first made, and continued running for some time during the progress of the main close drain, became gradually dry; and has not, since that drain was finished, discharged one single drop of water. Great care was necessary, in making the main close drain, to keep the stream of water in the middle of it, otherwise the current would have undermined the sides, as it sometimes had done, and caused them to fall in. For this reason it was necessary, when the dry sand was taken from the top of the quicksand, immediately to take out a spade's graft from the middle thereof, in order to divert the current from the sides.

The main close drain thus made was three feet wide at top, about nine feet deep on the average, and, beveling a little from the top, it was about one foot ten inches wide at the bottom. The stone and other materials were put into this drain in the following manner:

1. Where the drain went through the quicksand into the stratum of clay below it, as in most places it did, the bottom, and in some instances the sides, wanted no particular security; but where it did not go quite through the quicksand, which the level of his main open drain in some places would not admit, the bottom of the drain was covered half an inch thick with ling; then peat turfs, one foot wide and three or four inches thick, were cut in convenient lengths, and placed on their edges on each side of the bottom of the drain,

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forming two sides of a trough of peat; then side stones about eight inches high, and a stone coverer, were put in upon the ling between the peat turfs; a large peat-turf, near two feet wide and four inches thick, was then cut and firmly placed over the whole: this left in the bottom of the drain an open space, of more than six inches square, for the water to pass. The whole was then completed by filling in the upper part of the drain.

In this way the author drained for about 801. thirty acres of land, which from being of no value whatever, became worth at least 14 shillings per acre of yearly rent. He likewise hollow-drained nine acres by the method prescribed for the third class of wet land. These drains were made a few yards below that part of each field where the dry and wet land separate, about 22 inches deep, with sides and a coverer of stone, and ling on the top of it, to keep the earth from running in. The length of these drains was 880 yards, and the expence of labour and materials three halfpence *per* yard. The drains, in wet weather, discharge a large quantity of water; and will, he has no doubt, answer the intended purpose. Thus far relates to land in his own occupation.

Nine acres of the land in the earl of Aylesford's occupation was almost an entire pulp. This bog was of the second class, namely, water passing through a quicksand, and confined by a stratum of clay below, and another stratum of clay above it. The water thus confined, being pressed by its fountain, and forced up through the weakest parts of the clay, had formed a bog of irregular thickness on the surface, in some places six feet deep, in others not more than two. As there is a considerable fall in this land from east to west, he thought it expedient to put two drains into it; and this appears to him to have been necessary, from a consideration that both these drains continue to run in the same proportions as when first opened. The manner in which these drains were executed was, by digging through the different upper strata, and as deep into the clay as the main open drain would admit; then digging or boring through the remaining part of that clay into the quicksand, at the distance of about six yards, in a progressive manner.

The water rising rapidly through these holes into the close drains, has effected a complete cure of this land, every part of which will now bear a horse to gallop upon it. These drains discharge 3660 gallons an hour; which is much less than they did at first, as must be the case in all bogs. This land will be worth 20s. *per* acre. The draining cost 25l.; and the length of the under-ground drains is eight hundred and fourteen yards.

Mr Wedge had just finished (January 1792) draining another piece of land, about forty-three acres. As this was intended to answer two purposes, one, to drain the land, the other to give an additional supply of water to a mill-pool, and as a circumstance arose in the execution of the work which frequently happens in draining land, namely, a sudden alteration in the position of the under strata; a description thereof will not probably be thought tedious. This draining was begun at the level of a mill-pool, and continued, without any great difficulty, to the distance of about thirty-two chains, in the manner before described as a cure

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for the second class of boggy land: but at or near that place the under strata altered their position; the quicksand which conveyed the water now became of twice its former thickness; and the clay, which had hitherto been above that quicksand, for some distance disappeared. From the quicksand thus becoming so much deeper, he could not, with the level of the mill-pool, cut through it; nor indeed, from the wetness of the season, would such an operation have been proper. He therefore continued a shallow drain to some distance, making side-holes into the quicksand, which ran freely; but as this could not cure the whole of the bog below, he branched out another drain (which was made by the method described for curing the second class of wet or boggy land), by sinking a close drain through the upper strata into the upper clay, and then, at a small distance on one side of this close drain, boring a hole with an auger through the remaining part of that clay into the quicksand; and at every eight yards, as this close drain advanced, still boring other holes, in the manner before described: through many of these holes the water rushed with great rapidity. The water discharged by these drains into the mill-pool is 168 gallons *per* minute, or 3780 hogsheads in a day; which is after the rate of 1,379,700 hogsheads in a year.

About six acres of this land were always found; about twelve acres on the north side were an absolute pulp, and the remaining twenty-six acres very unsound. The whole is now sound, and will when cultivated be worth 16s. *per* acre. This land would have been drained at a much less expence into the main open drain; but then the water, which was much wanted for the mill, would have been lost. These close drains are in length 1452 yards, and cost 100l. of which about 30l. ought to be charged to the mill.

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Draining of
land-locked
bogs.

With regard to the drainage of land-locked bogs, which are often situated so much lower than the ground around them, that the cutting a main drain would cost more than the value of the land when drained; the mode of proceeding, with a view at once cheaply and effectually to relieve them from the superfluous moisture which renders them useless to agriculture, is the following: A spot in the middle or lowest part of the bog must be selected, towards which all the drains must be conducted, as radii to a common centre. When this central spot is properly cleared out to the top of the clay, or retentive substratum, which in this case must not be affected by water from below, but only by surface or rain water, a number of perforations must be made with the auger, to give an outlet downwards for the water, which will be absorbed by the porous stratum below. A conduit should be formed over the auger holes, by loose stones, placed in such a manner as to prevent their being afterwards filled up by any rubbish: or rather auger holes may not be sufficient; and it may be a preferable plan to make a large pit, or well, in the lowest part of the bog, dug through into the porous substrata. This pit ought to be filled with large stones, and the drains from the rest of the field conducted to that spot, as mentioned in the following quotation from the Agricultural Report of Hertfordshire.—“If a pit is sunk 20 or 30 feet deep in the middle of a field, through the Hertfordshire red, stinty, and impervious clay, into the chalk below; when the usual quantity of chalk is taken out, the pit

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shaft is filled up with the flint taken out of the chalk and clay, and the top drainage of this part of the field is much shortened for ever afterwards, by making principal drains from the part of the field above the level of the top of the pit terminate therein, as the superabundant moisture will escape through the flints in the pit shaft to the chalk below. And if a drain is carried into a limestone quarry, it is seldom necessary to carry it further.

“In dells or hollows, of considerable extent, covered with an impervious stratum, and from which there is no natural drainage, such as the valley between Mold, the shire-town of Flintshire, and the adjoining high land, a pit about four feet diameter, and 15 feet deep, more or less, as the case may require, is sunk through the impervious superstratum, into a pervious stratum of gravel, and the rain water, and that of some adjoining springs, are carried from the surface thereby; the pit is railed round to prevent cattle from falling into it. I must here remark, that though in this, as well as in many other instances that may be given, the top water escaped through the pervious substratum, the effect might have been directly the contrary. I therefore recommend the impervious superstratum, in all such cases, to be perforated by bore-rods, as the hole made by them is easily stopped up.”

In Dr Nugent's travels through Germany, published in 1768, a mode of draining marshes upon similar principles is described, as having been practised in that country. He had only seen it performed on moor grounds, though it is also successful with regard to lakes. “It is the nature, says he, of moors in general, that beneath the turf or moss there is a loam which hinders the moisture from penetrating; and this indeed is what makes the marsh, and causes the luxuriant growth of the turf or moss: but this loam or clay is only a stratum, and far from being of an immense depth; under it is generally a sand, or some other stony or loose soil.”

“Here reason readily informs us, that a middling morass may be drained by perforating the clay, and thus making way for the moisture to penetrate. In order to this, a pit is dug in the deepest part of the moor, till they come below the obstructing clay, and meet with such a spongy stratum as, in all appearance, will be sufficient to imbibe the moisture of the marsh above it. Into this pit the ebbing of the morass is conveyed through a trench, and both the trench and the pit are filled up after the first drain with large broad stones, setting them edgewise, so as to leave interstices for carrying off the water; then such stones are laid over breadthwise, and these covered with loose earth like that on the surface: when no such stones are to be had, strong piles are rammed down the sides of the trench, and broad boards laid across; and these are covered with earth to a height fit for culture. This is a matter of no great expence, the pit being as near the morass as the water will admit, and the trenches but short; then they have a drain unperceived, which leaves the surface of the trenches for the plough; and in middling marshes, especially in such moors as are only wet and damp, this method, though sometimes slow, never fails taking effect; and many tracts are thereby made serviceable to the farmer or grazier.”

The writer of the Roxburghshire Agricultural Report represents

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Preparation of Land. represents himself as having successfully adopted a similar mode of draining. In that part of the country, such of the waste lands, as are capable of being drained so as to become arable, have, at the distance of from one to six feet below the surface, a large stratum or seam of a black slaty or metallic substance, generally from 20 to 25 feet in thickness. Below this is a layer of whinstone rock of unknown depth. The black slaty or metallic substance has no chinks or fissures, and is impenetrable to water; but the whinstone rock beneath it abounds with chinks and fissures, and will swallow up any quantity of water poured into its bosom. The uppermost surface of the soil is of a light mossy nature, upon which the water stagnates in winter, so as to swell and enlarge it to a considerable degree. In the spring months, when dried by the sun and the wind, the moss becomes tolerably firm, and produces a coarse unprofitable grass, mixed with short heather; neither of which are of any value as food for sheep or cattle. In the year 1784 the writer of the Report ploughed up 20 acres of the waste lands of the above description, a part of them being situated on a level. This last part was gathered in small ridges, and ploughed pretty deep, and the stones removed. Thus it lay till midsummer 1785; but, during the spring, the sheep and cattle were frequently driven upon it to tread it to a firm consistence. At midsummer it was gathered up again; and, to get the water out of the hollows of the ridges, a pair of boring rods were obtained, which were put down through the slaty substance to the whinstone rock at sundry places. This effectually answered the purpose. The tops of the holes were kept open with baskets of loose stones over them, which were allowed to remain or removed at pleasure, as the weather proved more or less wet. In spring 1786 the land was in a condition to sow almost as early as any other part of the farm, the winter rains having found their way down into the whinstone rock through the slaty substance, and the land speedily became and continued very valuable.

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Draining of
quarries and
mines.

We may here add, that the modes of draining now stated are also valuable for other purposes than those of agriculture. Quarries, for example, and marl pits may often be cleared of water, by cutting off the springs by which they are incommoded, or by letting down the water into the next porous stratum. The same may be often done, with regard to deep mines, the working of which may frequently be thus greatly facilitated. A colliery, for example, in Yorkshire had been wrought for several years, and the water was raised from it about 60 yards by a steam engine. The proprietors having bored about ten yards farther, to ascertain the thickness of a seam of coals; as soon as the boring rods were withdrawn, the water from the works, which usually ran across that place, began to sink into the holes made by the rods; and, continuing to do so, the steam engine became useless, as its pump had no longer any water to draw. It must be observed, that the situation was higher than the nearest valleys, or the level of the sea; but this example shows of what extensive importance a knowledge of the principles upon which the above modes of draining proceeded may hereafter become.

3. Of rendering MOSSES fit for CULTIVATION.

In many parts of the country a very serious obstruc-

tion to the cultivation of large portions of territory arises from the existence of mosses. It is, therefore, of much importance to consider their nature, and how they are to be rendered fertile.

With regard to the nature and origin of moss, the celebrated Dr Anderson, whose works we have already frequently quoted, advances this opinion, that moss is a vegetable, or an assemblage of vegetables, growing or living below, while at the top it is dead. Hence, he distinguishes moss into two kinds; quick moss, from which peats are dug, on which no vegetables grow, and in which no animals exist, while in its natural situation; and dead moss, which frequently covers the former, and upon which heath and fog and coarse grasses grow, and insects and other animals are found. Mr Headrick states various objections to this opinion, some of which appear to have great force. Thus, it is observed, that the moss here supposed to be alive below the soil, has every mark of utter deadness and partial dissolution. When tossed about in a very dark night, it emits light like half rotten wood, giving rise to frequent terrors in those who live in the vicinity of peat bogs. It also seems a strange circumstance, and contrary to the whole analogy of nature, to suppose that a vegetable should grow, should form ligneous fibres, and acquire inflammability, without the influence of the sun, or contact with the air, during any period of its growth. The true history of the origin of mosses seems to be this: What are called the moss plants, amount to about three hundred in number. They are extremely hardy, and are capable of flourishing in the most cold and bleak situations, providing only they are surrounded by abundance of stagnating water. Accordingly, wherever water stagnates in a moderate quantity, they grow up, and, by spreading themselves around, they increase the stagnation. When they have arisen in this manner, with the water around them, to a considerable height, the lower part of their stems being continually soaked or macerated in water, cease to vegetate, and give forth their juices to the surrounding fluid. As the moss plants are extremely astringent, and contain large quantities of the gallic acid and tanning principle, the moss water acquires these qualities, or becomes astringent, in a great degree, and prevents any process of putrefaction from taking place, or the stems of the moss plants from suffering any proper process of rottenness, or chemical decomposition. Hence it is, that moss water has sometimes been used for tanning leather, in the same manner as the liquor of oak bark. In the mean time, while the stems of the moss plants remain in this manner dead, but prevented from rotting, or becoming the habitation of animals which cannot live in a vegetable astringent liquor, the tops of the plants that are at the surface of the water continue to grow, or new plants rise upon the summits of the dead ones, and continue their ascending progress; the whole being perhaps a sort of parasitical plants, which can grow upon each other.

In this way, a moss proceeds, rising higher and higher, till from the nature of the adjoining country, and the declivities in it, the water cannot stagnate to any greater depth. After the moss has come to this height, its farther growth is prevented, its plants, unable to live or grow without abundance of water, wither and die; the upper part of them being exposed to the action of the air, suffers an ordinary process of decomposition;

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like other vegetable remains, and is converted into a sort of soil, upon which a few plants and reptiles are sometimes found; while at a small depth, that is to say, below the surface of the stagnating water, the whole stems of the ancient moss plants continue macerated in their own liquor, and preserved from putrefaction by it.

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Black and
yellow
moss.

There are, however, two general kinds of mosses; black moss, and whitish or yellow moss. The black moss is originally of a mahogany colour, but speedily becomes black upon exposure to the air. The yellowish, or foggy moss, is much less compact than the former, and retains a light or yellowish colour after it is dried. It does not appear to be in such a perfect state of maceration as the black moss, has less variety of plants, and is never so solid. It is usually produced in low warm situations, and appears to have grown rapidly; whereas, the black moss is most commonly found in cold elevated lands, and seems to have consisted of a greater number of less luxuriant plants. Thus, moss may be regarded as bearing some resemblance to timber, which is always of a compact grain, and close texture, in proportion to the severity of the climate of which it is the product, or rather in proportion to the length of time which it has taken to grow.

From what has been here stated, it will not be difficult to understand the mode in which mosses come originally to find an existence, or to cover a piece of territory in any country. When a pool of water is speedily, or in a short time, formed to a great depth, no moss appears; but when a gradual stagnation to a small depth takes place, upon any spot, especially in a cold and exposed situation, there the moss plants (being the only ones capable of subsisting on such a soil) speedily grow up, and occupy the place of every other. Though the quantity of water that originally stagnated there might not be great, it is increased by degrees, in consequence of the additional obstruction produced by the roots, stems, and leaves of the moss plants, till at last it forms a bog of very great depth.—We have already mentioned the nature and causes of the stagnation of water. It may either occur in consequence of the figure and quality of the soil making it tenaciously to retain the falling rains, or it may be the consequence of springs or reservoirs of water pent up or confined in the bowels of the earth by an incumbent mass of clay. Struggling to rise up through this clay, it will wet every part of it, and will slowly ooze through all its less adhesive parts, and will form a soil fit only for the reception of moss plants, which will there, by obstructing the departure of the moisture, which is constantly rising, in the course of years rear up the surface into a complete and perfect peat-bog.

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Mosses pro-
duced by
cutting
down
forests.

But mosses not only arise in particular situations, in consequence of these operations of nature: They are also produced as the result of certain exertions of human industry. In almost all our mosses in this country great numbers of trees of various sorts are found. They remain, like the inferior parts or roots of moss plants, infused and macerated in the moss water, but not rotted. The trees and shrubs found at the bottom of mosses in Scotland, exhibit, perhaps, the whole variety of the native trees and shrubs. Of trees, are found the oak, the elm, the birch, the willow, the alder, and the fir. Of shrubs, we find the hazel, the dwarf willow, the gall

plant, and lastly, the heath plant. This last is of so hardy a nature, that it often continues to rise upon the moss during the whole period of its existence. Now,

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if it should be supposed, that at any time extensive forests of these trees were suddenly cut down by the exertions of man, they would undoubtedly produce a stagnation of water, and a bleakness of climate, that would render the situation fit only to be inhabited by moss plants, which would, therefore, speedily rise up, and form a peat-bog, in which multitudes of trees and shrubs would be found soaked in their own juice, and in the astringent liquor resulting from the maceration of the stems of the moss plants. That in ancient times old forests were thus destroyed by the efforts of man, we have every reason to believe. Not only in this country, but also in England and Ireland, there are found in mosses vast numbers of trees standing with their stumps erect, and their roots piercing the ground in a natural posture as when growing. Many of those trees are broken or cut off near the roots, and lie along, and this usually in a north-east direction. People who have been willing to account for this, have usually resolved it into the effect of the deluge in the days of Noah; but this is a very wild conjecture, and is proved false by many unanswerable arguments. The waters of this deluge might indeed have washed together a great number of trees, and buried them under loads of earth; but then they would have lain irregularly and at random; whereas, in this case, the trees all lie lengthwise from south-west to north-east, and the roots all stand in their natural perpendicular posture, as close as the roots of trees in a forest.

Besides, these trees are not all in their natural state, but many of them have the evident marks of human workmanship upon them, some being cut down with an axe; some split, and the wedges still remaining in them; some burnt in different parts, and some bored through with holes. These things are also proved to be of a later date than the deluge, by other matters found among them, such as utensils of ancient people, and coins of the Roman emperors.

It appears from the whole, that all the trees which we find in this fossil state, originally grew in the very places where we now find them, and have only been thrown down and buried there, not brought from elsewhere. It may appear indeed an objection to this opinion, that most of these fossil trees are of the fir kind; and that Cæsar says expressly, that no firs grew in Britain in his time: but this is easily answered by observing that these trees, though of the fir kind, yet are not the species usually called the *fir*, but pitch tree; and Cæsar has nowhere said that pitch trees did not grow in England. Norway and Sweden yet abound with these trees; and there are at this time whole forests of them in many parts of Scotland, and a large number of them wild upon a hill at Wareton in Staffordshire to this day.

In Hatfield marsh, where such vast numbers of the fossil trees are now found, there has evidently once been a whole forest of them growing. The last of these was found alive, and growing in that place within 70 years last past, and cut down for some common use.

It is also objected by some to the system of the firs growing where they are found fossil, that these countries

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tries are all bogs and moors, whereas these sorts of trees grow only in mountainous places. But this is founded on an error; for though in Norway and Sweden, and some other cold countries, the fir kinds all grow upon barren and dry rocky mountains, yet in warmer places they are found to thrive as well on wet plains. Such are found plentifully in Pomerania, Livonia, Courland, &c.; and in the west parts of New England there are vast numbers of fine lately trees of them in low grounds. The whole truth seems to be, that these trees love a sandy soil; and such as is found at the bottoms of all the mosses where these trees are found fossil. The roots of the fir kind are always found fixed in these; and those of oaks, where they are found fossil in this manner, are usually found fixed in clay: so that each kind of tree is always found rooted in the places where they stand in their proper soil; and there is no doubt to be made but that they originally grew there. When we have thus found that all the fossil trees we meet with once grew in the places where they are now buried, it is plain that in these places there were once noble forests, which have been destroyed at some time; and the question only remains how and by whom they were destroyed. This we have reason to believe, by the Roman coins found among them, was done by the people of that empire, and that at the time when they were established or establishing themselves here.

Their own historian tells us, that when their armies pursued the wild Britons, these people always sheltered themselves in the miry woods and low watery forests. Cæsar expressly says this; and observes, that Cassibelan and his Britons, after their defeat, passed the Thames, and fled into such low morasses and woods that there was no pursuing them: and we find that the Silures secured themselves in the same manner when attacked by Ostorius and Agricola. The same thing is recorded of Venutius king of the Brigantes, who fled to secure himself into the boggy forests of the midland part of this kingdom: and Herodian expressly says, that in the time of the Romans pushing their conquests in these islands, it was the custom of the Britons to secure themselves in the thick forests which grew in their boggy and wet places, and when opportunity offered, to issue out thence and fall upon the Romans. The consequence of all this was the destroying all these forests; the Romans finding themselves so plagued with parties of the natives issuing out upon them at times from the forests, that they gave orders for the cutting down and destroying all the forests in Britain which grew on boggy and wet grounds. These orders were punctually executed; and to this it is owing that at this day we can hardly be brought to believe that such forests ever grew with us as are now found buried.

The Roman histories all join in telling us, that when Suetonius Paulinus conquered Anglesea, he ordered all the woods to be cut down there, in the manner of the Roman generals in England: and Galen tells us, that the Romans, after their conquest in Britain, kept their soldiers constantly employed in cutting down forests, draining of marshes, and paving of bogs. Not only the Roman soldiers were employed in this manner, but all the native Britons made captives in the wars were obliged to assist in it: and Dion Cassius

tells us, that the emperor Severus lost no less than 50,000 men in a few years time in cutting down the woods and draining the bogs of this island. It is not to be wondered at, that such numbers executed the immense destruction which we find in these buried forests. One of the greatest subterranean treasures of wood is that near Hatfield; and it is easy to prove, that these people, to whom this havock is thus attributed, were upon the spot where these trees now lie buried. The common road of the Romans out of the south into the north, was formerly from Lindum (Lincoln) to Segelochum (Little Burrow upon Trent), and from thence to Danum (Doncaster), where they kept a standing garrison of Crispinian horse. A little off on the east, and north-east of their road, between the two last named towns, lay the borders of the greatest forest, which swarmed with wild Britons, who were continually making their sallies out, and their retreats into it again, intercepting their provisions, taking and destroying their carriages, killing their allies and passengers, and disturbing their garrisons. This at length so exasperated the Romans, that they were determined to destroy it; and to do this safely and effectually, they marched against it with a great army, and encamped on a great moor not far from Finningly: this is evident from their fortifications yet remaining.

There is a small town in the neighbourhood called *Qsterfeld*; and as the termination *feld* seems to have been given only in remembrance of battles fought near the towns whose names ended with it, it is not improbable that a battle was fought here between all the Britons who inhabited this forest and the Roman troops under Ostorius. The Romans slew many of the Britons, and drove the rest back into this forest, which at that time overspread all this low country. On this the conquerors taking advantage of a strong south-west wind, set fire to the pitch-trees, of which this forest was principally composed; and when the greater part of the trees was thus destroyed, the Roman soldiers and captive Britons cut down the remainder, except a few large ones which they left standing as remembrances of the destruction of the rest. These single trees, however, could not stand long against the winds, and these falling into the rivers which ran through the country, interrupted their currents; and the water then overspreading the level country, made one great lake, and gave origin to the mosses or moory bogs, which were afterwards formed there, by the workings of the waters, the precipitation of earthy matter from them, and the putrefaction of rotten boughs and branches of trees, and the vast increase of water moss and other such plants which grow in prodigious abundance in all these sorts of places. Thus were these burnt and felled trees buried under a new formed spongy and watery earth, and afterwards found on the draining and digging through this earth again.

Hence it is not strange that Roman weapons and Roman coins are found among these buried trees; and hence it is that among the buried trees some are found burnt, some chopped and hewn; and hence also it is that the bodies of the trees all lie by their proper roots, and with their tops lying north-east, that is, in that direction in which a south-west wind would have blown them down: hence also it is, that some of the trees

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are found with their roots lying flat, these being not cut or burned down, but blown up by the roots afterwards when left single; and it is not wonderful, that such trees as these should have continued to grow even after their fall, and shoot up branches from their sides which might easily grow into high trees. (*Phil. Transf.* N^o 275.)

By this system it is also easily explained why the moor soil in the country is in some places two or three yards thicker than in others, or higher than it was formerly, since the growing up of peat earth or bog ground composed of moss plants is well known, and the soil added by overflowing of waters is not a little.

As the Romans were the destroyers of this great and noble forest, so they were probably also of the several other ancient forests; the ruins of which furnish us with the bog wood of Staffordshire, Lancashire, Yorkshire, and other counties. But as the Romans were not much in Wales, in the Isle of Man, or in Ireland, it is not to be supposed that forests cut down by these people gave origin to the fossil wood found there; but though they did not cut down these forests, others did; and the origin of the bog wood is the same with them and with us. Holinhead informs, that Edward I. being not able to get at the Welsh because of their hiding themselves in boggy woods, gave orders at length that they should all be destroyed by fire and by the axe; and doubtless the roots and bodies of trees found in Pembrokeshire under ground, are the remains of the execution of this order. The fossil wood in the bogs of the island of Man is doubtless of the same origin, though we have not any accounts extant of the time or occasion of the forests there being destroyed; but as to the fossil trees of the bogs of Ireland, we are expressly told, that Henry II. when he conquered that country, ordered all the woods to be cut down that grew in the low parts of it, to secure his conquests, by cutting away the places of resort of rebels.

The tendency of our climate to produce in cold and damp situations moss plants, which gradually form around themselves a liquor which is the enemy of all putrefaction, may be considered as a fortunate circumstance, upon the whole, for the preservation of the health of men and animals, as well as contributing to other valuable purposes. In considering the nature of moss, "I cannot dismiss the subject (says Mr Headrick) without suggesting my admiration at the beneficence of Providence, in having provided the moss plants for the situations in which they grow: they afford an immediate supply of fuel, and are the source from which pit-coal derives its origin, though trees, and all the plants which abound in oils and carbon also contribute to the supply of pit-coal. Were the places now occupied by mosses divested of vegetables, or stored with vegetables of a different character, they would become noisome fens, which, by the emission of putrid gasses, would spread all around them pestilence and death. Mosses emit no noxious gasses, but rather, by growing at the surface, where the plants are acted upon by the sun's rays, they perpetually throw out oxygen, and thus contribute to the salubrity of the atmosphere. The only defect with which they are chargeable is, forming magazines of moisture, which by its exhalation generates cold, and spreads rheumatism and inter-

mitting fevers among all the animals within its reach. The perpetual evaporation of this moisture not only tends to chill the moss, but it descends in hoar-frost and mildews upon all the lands that are lower in point of situation. These last mentioned disadvantages are more than amply compensated by the consideration that moss is not only an inexhaustible magazine of manure for other soils, but may be converted into a most fertile soil itself. After it is so converted, none of the defects already stated are any longer applicable to it."

This gentleman analyzed chemically some specimens of moss. He found that a small portion of Berkshire peat of great hardness exhibited, when pounded in a mortar and infused in warm water, a liquor that had some slight marks of acidity by test paper. Gypsum and sulphat of magnesia appeared to exist in it. A purified potash produced an abundant precipitation of various substances. A portion of this peat being burned, gave forth at the close of the operation a sulphureous smell and flame. The white ashes, after some days, assumed a rusty colour, from iron contained in them. Being washed, the liquor appeared to contain sulphates of lime, magnesia, alumine, and iron. Black hard peat of Swinidge moor, in Ayrshire, when burned, gave brown ashes which were attracted by the magnet. An infusion of them in water exhibited no mark of acid or of alkali, and the ingredients contained in it appeared to be the same as in the Berkshire peat. Foggy or yellow peat yielded a smaller quantity of ashes, which were white, and did not obey the magnet.

Moss water obtained by squeezing light peats contained gallic acid and tanning principle in great quantities. Quicklime appeared to be the most powerful agent in precipitating every substance from the moss water, and in rendering moss a compact and solid substance; a fact which, as will be afterwards noticed, has been successfully taken advantage of in practice.

There are two ways in which a tract of territory that is covered by moss may be reduced under the dominion of the plough, or rendered fit for the purposes of agriculture. The one consists of altogether removing the mossy substance, or the whole wrecks of the moss plants that have been accumulating for ages, and endeavouring thereafter to cultivate the subsoil. The other mode consists of converting the substance of the moss into vegetable mould fit for bearing crops of grain.

The first of these plans has been adopted with regard to the moss of Kincardine, and the other has been successfully practised by Mr Smith of Swinridge-muir, in Ayrshire; and in imitation of him by various other persons in different districts of the country. To each of these we shall give attention.

The moss of Kincardine is a remarkable tract of the moss ground in the shire of Perth, in Scotland, which deserves particular notice, both as a topographical curiosity or subject of natural history, and for the information, equally uncommon and important, which it affords, respecting agricultural improvement, and the promotion of industry and population.

The moss of Kincardine is situated in the parish of the same name, comprehended between the rivers Forth and Teith, and in that district of Perthshire called *Monteith*. The moss begins about a mile above the confluence of these rivers; from thence it extends in length

Preparation of Land. length about four miles, and from one to two in breadth; and before the commencement of the operations (an account of which is to be given), comprehended near 2000 Scots acres, of which about 1500 belong to the estate of Blair Drummond, the property of the late Lord Kames, by his marriage with Mrs Drummond of Blair Drummond.

As mosses are extremely various in their nature; before entering upon the improvements made in Kincardine moss, it will be proper to give a short description of that moss, and of the subjacent soil which is the object of those improvements.

The moss lies upon a field of clay, which is a continuation of those rich extensive flats in the neighbourhood of Falkirk and Stirling, distinguished by the name of *carfes*. This clay, which is one uniform homogeneous mass sinking to a great depth, is found near the surface, consists of different colours, and is disposed in layers. The uppermost is gray; the next is reddish; and the lowest, which is the most fertile, is blue. Through the whole mass not a pebble is to be found. The only extraneous bodies it contains are sea-shells, which occur in all the varieties peculiar to the eastern coast of Scotland. They are disposed sometimes in beds, sometimes scattered irregularly at different depths. By attending to these circumstances, it cannot be doubted that the sea has been the means of the whole accumulation, and that it was carried on in a gradual manner by the ordinary ebb and flow of the tide. Upon any other supposition, why should there not have been a congeries of all the different materials that compose the surface of the surrounding heights? But to whatever cause the origin of this accumulation may be ascribed, certain it is that no soil whatever is more favourable to vegetation, or carries more abundant crops of every kind.

The surface of the clay, which, upon the retreat of the sea, had been left in an almost level plane, is everywhere thickly covered with trees, chiefly oak and birch, many of them of a great size. These trees seem to have been the first remarkable produce of the carse; and it is probable they were propagated by dissemination from the surrounding eminences. They are found lying in all directions beside their roots, which still continue firm in the ground in their natural position; and from impressions still visible, it is evident they have been cut with an axe or some similar instrument. For the cutting of wood, the two common purposes are, either to apply it to its proper use, or that the ground it occupies may be cultivated. In the present case, however, neither of these ends had been proposed, since the trees, by being left just as they were cut, were not only entirely lost, but the ground was rendered totally unfit for cultivation. Hence it is evident, that the downfall of this wood must be ascribed to some more extraordinary cause; and to none more probably than to that expedient, which, as we learn from Dion Cassius and other historians, the Romans put so extensively in practice to dislodge from their forests the ancient inhabitants of the British islands, as already explained.

This hypothesis acquires no small degree of force from a circumstance that occurred in May 1768, when a large round vessel of thin brass and curious workmanship, 25 inches in diameter, and 16 inches in height,

Preparation of Land. was discovered upon the surface of the clay buried under the moss. This vessel, found upon the estate of John Ramsay, Esq. of Ochtertyre, was by that gentleman presented to the Antiquarian Society of Edinburgh; in whose museum it remains deposited for preservation. And in a list of the various donations presented to that society, published by them in 1782, it is there denominated a *Roman camp kettle*.

Between the clay and the moss is found a stratum nine inches thick, partly dark brown and partly of a colour approaching to black. This is a vegetable mould, accumulated probably by the plants that covered the ground previous to the growth of the wood, and by leaves from the trees thereafter. The difference of colour must be owing to a difference in the vegetable substances that compose it. The brown mould is highly fertile; the other, especially in a dry season, is very unproductive. The crop that had occupied this mould when the trees were felled is found still entire. It consists chiefly of heath; but several other smaller plants are also very distinguishable.

Immediately above this stratum lies the moss, to the height, upon an average, of seven feet. It is composed of different vegetables arranged in three distinct strata. Of these the first is three feet thick. It is black and heavy, and preferable to the others for the purpose of fuel. It consists of bent grass (*agrostis*), which seems to have grown up luxuriantly among the trees after they were felled. The second stratum also is three feet thick. It is composed of various kinds of mosses, but principally of bog-moss (*Sphagnum*). It is of a fallow or iron colour, and remarkably elastic. It is commonly called *white peat*; and for fuel is considered as much inferior to that above mentioned. The third stratum is composed of heath and a little bent grass, but chiefly of the deciduous parts of the former. It is about a foot thick, and black.

By far the greatest part of the moss in question is, upon an average, full seven feet deep, and has in all probability lain undisturbed since its formation: this is called the *High Moss*. The remainder, called the *Low Moss*, lies to a considerable breadth around the extremities of the high; and is, upon an average, not above three feet in depth, to which it has been reduced by the digging of peats. These are formed of that stratum of the moss only that lies four feet below the surface and downwards; the rest is improper for the purpose, and is thrown aside.

Before the introduction of the plan which is now pursued, two methods chiefly were employed to gain land from the moss. 1st, The surrounding farmers marked off yearly a portion of the low moss next to their arable land, about 15 feet broad. This they removed with carts and spread upon their fields, some acres of which they for that end left unsown. Here it lay till May or June; when, being thoroughly dry, it was burnt to ashes to serve as a manure. By this means they added to their farms about half a rood of land yearly. But this plan proved unsuccessful; for by the repeated application of these ashes, the soil was rendered so loose that the crops generally failed. 2dly, Many farmers were wont to *trench down* the low moss, and to cover it *furrow deep* with clay taken out of the trench. This, though commendable as an attempt to improve,

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improve, proved likewise an unavailing method; because in a dry season the superficial covering of clay retains so little moisture that the crop commonly fails.

It has been attempted to cover the moss with clay brought from the adjacent grounds. But what from the necessary impoverishment of the ground from which the clay was carried, and the softness of the moss, this was soon found to be impracticable.

Draining has also been proposed as another mode of improvement; and it must be acknowledged, that, by means of draining, many mosses have been converted both into arable and meadow grounds, which in the end became interesting improvements. But in a moss, such as that of Kincardine, this method would be ineffectual; as for several feet deep it is of such a nature, that upon being dry, and divided into parts, it would blow with the wind like chaff; and when thrown aside in the operation of digging peats, it lies for years without producing a single vegetable, except only a few plants of sorrel.

Hence it was thought evident, that all attempts to improve this moss must ever prove abortive; and that the object to be had in view was the acquisition of the valuable soil lying underneath; to which end nothing less was requisite than the total abolition of the moss.

By the methods above described from 100 to 200 acres of moss had been removed. When the present plan was introduced, there still remained covered with moss from 1300 to 1400 acres of carse clay—a treasure for which it must be ever interesting to dig.

In the year 1766 Lord Kames entered into possession of the estate of Blair Drummond. Long before that period he was well acquainted with the moss, and often lamented that no attempt had ever been made to turn it to advantage. Many different plans were now proposed; at length it was resolved to attempt, by means of water as the most powerful agent, entirely to sweep off the whole body of moss.

That moss might be floated in water, was abundantly obvious; but to find water in sufficient quantity was difficult, the only stream at hand being employed to turn a corn mill. Convinced of the superior consequence of dedicating this stream to the purpose of floating off the moss, Lord Kames having made an agreement with the tenant who farmed the mill, and the tenants thirled consenting to pay the rent, he immediately threw down the mill, and applied the water to the above purpose.

In order to determine the best manner of conducting the operation, workmen were now employed for a considerable time upon the low moss both by the day and by the piece, to ascertain the expence for which a given quantity of moss could be removed. It was then agreed to operate at a certain rate per acre; and in this manner several acres were removed.

But this was to be a very expensive process. The ground gained might, indeed, be afterwards let to tenants; but every acre would require an expence from 12l. to 15l. before it could be ready for sowing; so that the acquisition of the whole, computing it at a medium to be 1350 acres, would sink a capital of nearly 20,000l. sterling.

One other method still remained; namely, to attempt letting portions of the moss, as it lay, for a term of years sufficient to indemnify tenants for the

expences incurred in removing it. For some time both these plans were adopted; but several reasons made the latter preferable: 1. The quantity of water to be had was small; and being also uncertain, it was very inconvenient for an undertaker; neither were there any houses near the spot, which occasioned a great loss of time in going and coming: but when a man should live upon the spot, then he could be ready to seize every opportunity. 2. The moss was an useless waste. To let it to tenants would increase the population of the estate, and afford to a number of industrious people the means of making to themselves a comfortable livelihood.

In the mean time it was determined, till as many tenants should be got as could occupy the whole water, to carry on the work by means of undertakers.

But before proceeding farther, it will be necessary to describe the manner of applying water to the purpose of floating the moss.

A stream of water sufficient to turn a common corn-mill will carry off as much moss as 20 men can throw into it, provided they be stationed at the distance of 100 yards from each other. The first step is to make in the clay, alongside of the moss, a drain to convey the water: and for this operation the carse clay below the moss is peculiarly favourable, being perfectly free from stones and all other extraneous substances, and at the same time, when moist, slippery as soap; so that not only is it easily dug, but its lubricity greatly facilitates the progress of the water when loaded with moss. The dimensions proper for the drain are found to be two feet for the breadth and the same for the depth. If smaller, it could not conveniently receive the spadefuls of moss; if larger, the water would escape, leaving the moss behind. The drain has an inclination of one foot in 100 yards; the more regularly this inclination is observed throughout, the less will the moss be liable to obstructions in its progress with the water. The drain being formed, the operator marks off to a convenient extent alongside of it a section of moss, 10 feet broad; the greatest distance from which he can heave his spadeful into the drain. This he repeatedly does till the entire mass be removed down to the clay. He then digs a new drain at the foot of the moss bank, turns the water into it, and proceeds as before, leaving the moss to pursue its course into the river Forth, a receptacle equally convenient and capacious; upon the fortunate situation of which, happily forming for several miles the southern boundary of the estate, without the interposition of any neighbouring proprietor, depended the very existence of the whole operations.

When the moss is entirely removed, the clay is found to be encumbered with the roots of different kinds of trees standing in it as they grew, often very large: their trunks also are frequently found lying beside them. All these the tenants remove, often with great labour. In the course of their operations they purposely leave upon the clay a stratum of moss six inches thick. This, in spring, when the season offers, they reduce to ashes, which in a great measure ensures the first crop. The ground thus cleared is turned over, where the dryness admits, with a plough, and, where too soft, with a spade. A month's exposure to the sun, wind, and frost, reduces the clay to a powder fitting

Preparation of Land. fitting it for the seed in March and April. A crop of oats is the first, which seldom fails of being plentiful, yielding from eight to ten bolls after one.

In the year 1767 an agreement was made with one tenant for a portion of the low mofs. This, as being the first step towards the intended plan, was then viewed as a considerable acquisition. The same terms agreed upon with this tenant have ever since been observed with all the rest. They are as follow :

The tenant holds eight acres of mofs by a tack of 38 years ; he is allowed a proper quantity of timber, and two bolls of oatmeal to support him while employed in rearing a house ; the first seven years he pays no rent ; the eighth year he pays one merk Scots ; the ninth year two merks ; and so on with the addition of one merk yearly till the end of the first 19 years ; during the last five years of which he also pays a hen yearly. Upon the commencement of the second 19 years, he begins to pay a yearly rent of 12s. for each acre of land cleared from mofs, and 2s. 6d. for each acre not cleared, also two hens yearly : A low rent indeed for so fine a soil ; but no more than a proper reward, for his laborious exertions in acquiring it.

In the year 1768 another tenant was settled. These two were tradesmen ; to whom the preference was always given, as having this great advantage to recommend them, that even when deprived of water they need never want employment. The motives that induced these people to become settlers were, 1st, The prospect of an independent establishment for a number of years. 2dly, The mofs afforded them great abundance of excellent fuel ; to which was added the comfortable consideration, that, while busied in providing that necessary article, they had the double advantage of promoting, at the same time, the principal object of their settlement.

Notwithstanding these inducements, still settlers offered slowly : to which two circumstances chiefly contributed : 1st, The whole farmers surrounding the mofs threw every possible obstruction in their way. 2dly, By people of all denominations the scheme was viewed as a chimerical project, and became a common topic of ridicule. The plan, however supported itself ; and in the year 1769 five more tenants agreed for eight acres each ; and thus 56 acres of low mofs were disposed of. From the progress made by the first settlers, and the addition of these, the obloquy of becoming a mofs tenant gradually became less regarded ; so that in the year 1772 two more were added ; in 1773, three ; and in 1774, one ; in all 13 : which disposed of 104 acres ; all the low mofs to which water could then be conveyed. As water is the main spring of the operation, every tenant, besides the attention necessary to his share of the principal stream, collected water by every possible means, making ditches round his portion of the mofs, and a reservoir therein to retain it till wanted.

The tenants in the low mofs having now begun to raise good crops, in the year 1774 several persons offered to take possessions in the high mofs, upon condition that access to it should be rendered practicable. The high mofs wanted many advantages that the low possessed. To the low mofs, lying contiguous to the surrounding arable lands, the access was tolerably good ; but from the arable lands the high mofs was separat-

ed by 300 or 400 yards of the low, which, even to a man, affords but indifferent footing, and to horses is altogether impracticable. The low mofs is in general only three feet deep ; the high mofs is from six to twelve feet in depth.

It will appear at first sight, that without a road of communication the high mofs must forever have proved unconquerable. Without delay, therefore, a road was opened to the breadth of 12 feet, for several hundred yards in length, by floating off the mofs down to the clay.

This being effected, and at the same time an opening given to admit water, in the year 1775 twelve tenants agreed for eight acres of high mofs each. In consideration of the greater depth of this part of the mofs, it was agreed, that during the first 19 years they should pay no rent ; but for the second 19 years the terms of agreement were the same as those made with the tenants in the low mofs. To the above-mentioned tenants every degree of encouragement was given ; as upon their success depended, in a great measure, the disposal of the great quantity of mofs still remaining. But their success, however problematical, was such, that next year, 1776, six more took eight acres each ; in 1777, one ; in 1778, four ; in 1779, three ; in 1780, one ; in 1781, one ; in 1782, one :—In all, including those upon the low mofs, 42 tenants, occupying 336 acres.

Though for some time the disposal of the high mofs went but slowly on, it was not for want of tenants ; but the number of operators was already sufficient for the quantity of water ; to have added more would evidently have been imprudent.

In the year 1783 Mr Drummond entered into the possession of the estate of Blair Drummond, and went fully into the plan adopted by his predecessor for subdividing the mofs. At this time there still remained undisposed of about 1000 acres of high mofs. As water was the great desideratum, it was determined, that to obtain that necessary article neither pains nor expence should be wanting. Steps were accordingly taken to ascertain in what manner it might be procured to most advantage.

Meanwhile, to prepare for new tenants, a second road parallel to the former, at the distance of half a mile, was immediately begun and cut, with what water could be got, down to the clay, 12 feet broad and 2670 yards long, quite across the mofs. This opening was previously necessary, that operators might get a drain formed in the clay to direct the water ; and it was to remain as a road that was absolutely necessary, and which relieved settlers from an expence they were unable to support. These preparations, the progress of the former tenants, and the prospect of a farther supply of water, induced 10 more to take possessions in the year 1783 : in the year 1784, 18 more took possessions ; and in 1785 no fewer than 27 :—in all 55 tenants in three years : which disposed of 440 acres more of the high mofs.

As the introduction of an additional stream to the mofs was to be a work both of nicety and expence, it was necessary to proceed with caution. For this reason several engineers were employed to make surveys and plans of the different modes by which it might be procured. In one point they all agreed, that the pro-

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per source for furnishing that supply was the river Teith, a large and copious stream that passes within a mile of the moss; but various modes were proposed for effecting that purpose.

To carry a stream from the river by a cut or canal into the moss was found to be impracticable; and Mr Whitworth (B) gave in a plan of a pumping machine, which he was of opinion would answer the purpose extremely well.

Soon after this Mr George Meikle of Alloa, a very skilful and ingenious millwright, gave in a model of a wheel for raising water entirely of a new construction, of his own and his father's invention jointly. This machine is so exceedingly simple, and acts in a manner so easy, natural, and uniform, that a common observer is apt to undervalue the invention: But persons skilled in mechanics view machinery with a very different eye; for to them simplicity is the first recommendation a machine can possess. Accordingly, upon seeing the model set to work, Mr Whitworth, with that candour and liberality of mind that generally accompany genius and knowledge, not only gave it the greatest praise, but declared that, for the purpose required, it was superior to the machine recommended by himself, and advised it to be adopted without hesitation.

The better to explain this machine, two sketches are annexed, to the first of which the following letters refer. The explanation of the second will be found upon the sketch.

Plate XIII.

a, Sluice through which is admitted the water that moves the wheel.

b, b, Two sluices through which is admitted the water raised by the wheel.

c, c, A part of one of two wooden troughs and an aperture in the wall, through which the above water is conveyed into the buckets. [The other trough is hid by two stone walls that support the wheel.]

d, d, d, Buckets, of which 80 are arranged on each side of the arms of the wheel = 160.

e, e, e, A cistern, into which the water raised by the buckets is discharged.

f, f, f, Wooden barrel pipes, through which the water descends from the cistern under ground to avoid the high road from Stirling, and the private approach to the house.

Sketch second contains a plan of the cistern, and exhibits the manner in which the water is filled into the buckets.

The diameter of the wheel to the extremities of the float-boards is 28 feet; the length of the float-boards 10 feet. The wheel makes nearly four revolutions per minute; in which time it discharges into the cistern 40 hogheads of water. But this is not all the wheel is capable of performing; for by several accurate trials by Messrs Whitworth and Meikle, in the result of which, though made separately, they perfectly agreed, it was found that the wheel was able to lift no less than 60 hogheads per minute; but that the diameter of the pipes through which the water descends from the ci-

stern would not admit a greater quantity than what they already receive.

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To a person at all conversant in hydraulics, the resemblance of this to the Persian wheel must be obvious: and indeed it is probable, that from the Persian wheel the first idea of this machine was derived. But admitting this, still the superiority of the present wheel is, in most respects, so conspicuous, as to entitle it to little less praise than the first invention. For, 1st, In the Persian wheel, the buckets being all moveable, must be constantly going out of order: In this wheel they are all immoveable, consequently never can be out of order. 2dly, Instead of lifting the water from the bottom of the fall, as in the Persian wheel, this wheel lifts it from the top of the fall, being from four to five feet higher; by which means some additional power is gained. 3dly, By means of the three sluices (*a*, and *b, b*, fig. 1.) in whatever situation the river may be, the quantity of the water to be raised is so nicely adjusted to that of the moving power, as constantly to preserve the wheel in a steady and equable motion. In short, as a regulator is to a watch, so are these sluices to this wheel, whose movements would otherwise be so various, as sometimes to carry the water clear over the cistern, sometimes to drop it entirely behind, but seldom so as fully to discharge the whole contents of the buckets into the cistern.

It is however but candid to remark, that this machine labours under a small defect, which did not escape the observation of Mr Whitworth; namely, that by raising the water about $3\frac{1}{2}$ feet higher than the cistern where it is ultimately delivered, a small degree of power is lost. To this, indeed, he proposed a remedy; but candidly confessed, that as it would render the machine somewhat more complex, and would also increase the friction, he thought it more advisable to keep it in its present state. As the same time he justly observed, that as the stream by which the wheel is moved is at all times copious and powerful, the small loss of power occasioned by the above circumstance was of little or no avail.

This stream is detached from the Teith at the place where that river approaches nearest to the moss. The surface of the latter is about 15 feet higher than that of the former; the cistern is therefore placed 17 feet above the surface of the stream, so as to leave a declivity sufficient to deliver the water upon the surface of the moss.

The pipes through which the water descends from the cistern are composed of wooden barrels hooped with iron, 4 feet long and 18 inches in diameter within.

In these pipes, having been conveyed under ground for 354 yards from the cistern, the water at once emerges into an open aqueduct. This aqueduct, which was formed according to a plan by Mr Whitworth, is constructed wholly of earth or clay; and in order to keep the water on a level with the surface of the moss, it is for nearly two-thirds of its course elevated from 8 to 10 feet above the level of the adjacent grounds; the base being 40 feet broad, the summit 18 feet, and the water

(B) This gentleman was superintendant of the London water works, and an engineer of great reputation in England. He was several years employed in Scotland in completing the great canal.

Preparation of Land. water course 10 feet broad. It commences at the termination of the pipes; from whence extending above 1400 yards, it discharges the water into a canal formed for its reception on the surface of the mofs.

For raising the water to this height there were two reasons: 1st, That not only where it was delivered on the mofs, but even after being conveyed to the most distant corners, it might still retain sufficient power to transport the mofs to the river Forth. 2dly, That reservoirs of a sufficient height might be formed in the mofs to retain the water delivered during night.

In consequence of Mr Whitworth's advice, a contract was entered into with Mr Meikle in spring 1787; and by the end of October in that year, the wheel, pipes, and aqueduct, were all completely finished; and what, in so complex and extensive an undertaking, is by no means common, the different branches of the work were so completely executed, and so happily adjusted to each other, that upon trial the effect answered the most sanguine expectations. The total expence exceeded 1000l. sterling.

To induce the proprietor to embark in this undertaking, the mofs tenants had of their own accord previously come under a formal engagement to pay the interest of any sum that might be expended in procuring a supply of water. But he was determined they should not enjoy by halves the sweets of this long wished for acquisition. With a view, therefore, not only to reward their past industry, but to rouse them to future exertions, he at once set them free from their engagement; nor has any interest ever been demanded.

This new supply was a most acceptable boon to the mofs tenants. In order to make an equitable distribution, the water raised through the day was allotted to one division of operators; that raised during the night to another. To retain the latter, a canal was formed, extending almost three miles through the centre of the mofs. From place to place along the sides are inserted sluices to admit water to the reservoirs of the possessors; each sluice having an aperture proportioned to the number of operators to be supplied from the reservoir which it fills. For the water raised through the day no reservoirs are necessary; as it is immediately used by the division to which it is allotted.

This additional stream, though highly beneficial, yet is not more than sufficient to keep 40 men at constant work. But such a quantity as would give constant work is not necessary: the operators must be often employed in making and repairing their drains, grubbing up roots of trees, &c.; so that a quantity sufficient to give five or six hours work per day to the whole inhabitants is as much as would be wanted. But as the quantity procured was still insufficient for this purpose, a small stream that descended from the higher grounds was diverted from its course and brought into the mofs. From want of level this stream could not be delivered to the greatest advantage; namely, upon the surface of the mofs. Yet by making, at a considerable expence, a drain half a mile long, and a reservoir for the night water, it was rendered of much importance: and during the whole winter months, as well as in summer, after every fall of rain, it keeps 15 persons fully employed.

In the year 1787, two more tenants agreed for Preparation of Land. eight acres each; in 1788, four; in 1789, eight; in 1790, four tenants, all agreed for the same number of acres.

The whole mofs was now disposed of, except that part called *Flow Mofs*, which comprehended about 400 acres. Here it is twice the usual breadth so fluid that a pole may be thrust with one hand to the bottom; and the interior part, for near a mile broad, is three feet above the level of all the rest of the mofs. Hitherto the many and various difficulties that presented themselves had been overcome by perseverance and expence. But here the extraordinary elevation of the morafs, joined to its great fluidity, seemed to exclude all possibility of admitting a stream of water; and it was the general opinion that the mofs operations had now arrived at their *ne plus ultra*, and that this morafs was doomed to remain a nuisance for ages to come.

But the proprietor had now advanced so far that he could not submit to retreat: and he considered himself as, in some measure, pledged to the country for the completion of this undertaking. To detail the various methods practised to introduce a stream of water into that morafs, would prove tedious. It is sufficient to say, that after a thousand unsuccessful efforts, attended with much trouble and considerable expence, the point at last was gained, and a stream of water was brought in, and carried fairly across the centre of the morafs.

The greatest obstacle was now indeed overcome; but still another remained of no small moment, namely, the discouragement given to settlers from the total impossibility of erecting habitations upon the surface of this morafs. To find a remedy for this evil was difficult. Happily a resource at last occurred. This was to bargain with a certain number of the old tenants, whose habitations were nearest, to take leases of portions of the morafs. But as some additional aid was here necessary, it was agreed that 12l. sterling should be gradually advanced to each tenant till he should accomplish the clearing of an acre, for which he or his successor is bound to pay 12s. of yearly rent, equal to five *per cent.* upon the sum advanced. When this point shall be gained, they are bound to dispose, as most agreeable to themselves, either of their old or of their new possession; for which, when once an acre is cleared, purchasers will not be wanting.

In consequence of the above arrangement, during the year 1791 no fewer than 35 of the old tenants agreed, upon the forefaid conditions, for eight acres each of the flow mofs. Thus 1200 acres are now disposed of to 115 tenants. But when these 35 tenants shall each have cleared their acre, then, according to agreement, 35 additional tenants will speedily be acquired; and the mofs will then contain in all 150 families.

To the leases at first granted to the tenants in the high mofs, it was afterwards determined to add a further period of 19 years (making in all 57 years), during which they are to pay one guinea *per acre*; a rent not greater than the land is worth even at present, but greatly below its probable value at that distant period. This, it is hoped, will prove to the tenants a sufficient incentive.

Preparation of Land. ment to continue their operations till their possessions are completely cleared from moss.

Having now gone through, in detail, the whole progress of the colony for many years after its first settlement in the year 1767, it still remains to take a general view of the effects produced by that establishment.

For several years, at first, the water was used chiefly to carry off moss, in the forming of new roads, and preparing reservoirs; which considerably retarded the principal object, of gaining land. Nevertheless there have been cleared full 300 acres of excellent land, producing wheat, barley, oats, and clover, yielding from six to twelve bolls after one.

From the nature of the undertaking, there is good reason to suppose that the operations will yearly advance with greater rapidity; especially as the greater number of the settlers have only of late begun to operate. Many, besides maintaining their families otherwise by occasional employments, have in the high moss cleared in a year one rood of land; some have cleared two, some three roods, and in the low moss an acre.

It was a remark often made, even by persons of some observation, that by collecting together such a number of people, Kincardine would be overstocked; and the consequence would be their becoming a burden on the parish: for as the bulk of them were labourers not bred to any trade, and possessed of little stock, it was foreseen, that, for some time, they could not afford to confine themselves solely to the moss, from which the return must be slow; but behaved, for immediate subsistence, to work for daily hire. Happily these predictions have proved entirely groundless; for such is the growing demand for hands in this country, that not only do the whole of these people find employment whenever they choose to look for it, but their wages have been yearly increasing from the time of their first establishment. In short, they have proved to the corner where they are set down a most useful nursery of labourers; and those very farmers who, at first, so strongly opposed their settlement, now fly to them as a sure resource for every purpose of agriculture. Still they consider the moss operations as their principal business; none pay them so well; and when they do leave it to earn a little money, they return with cheerfulness to their proper employment. Many of them already raise from 10 to 60 bolls of grain, and have no occasion to go off to other work; which will soon be the case with the whole. Their original stock, indeed, did not often exceed 25*l.* and some had not even 10*l.*; but what was wanting in stock is compensated by industry.

Of the whole inhabitants full-nine tenths are Highlanders, from the neighbouring parishes of Callander, Balquhider, &c.; a sober, frugal, and industrious people, who, inured to hardships in their own country, are peculiarly qualified to encounter so arduous an undertaking. From this circumstance, too, arises a very happy consequence; that wearing a different garb and speaking a different language from the people amongst

whom they are settled, they consider themselves in a manner as one family transported to a foreign land: and hence upon all occasions of difficulty, they fly with alacrity to each others relief. Neither ought it to be forgotten, that, from their first settlement to the present day, not a single instance has occurred amongst them of theft, bad neighbourhood, or of any other misdemeanour, that required the interposition of the civil magistrate. Nor, however poor in circumstances, has any one of them ever stooped to solicit assistance from the funds of the parish appropriated to that purpose.

Though few of the tenants entered with a large stock, one only has been obliged to leave the moss from incapacity to proceed. Many indeed have spent their small stocks, and even run a little in debt: but in this case they have been permitted to sell their tacks upon the following conditions: 1st, That the purchaser shall be a good man; 2dly, That the seller shall take another possession. By this manœuvre a new inhabitant is gained; while the old one, relieved from debt, and aided by past experience, recommences his operations with double spirit upon a new possession. The monied man again has at once a house and a piece of ground, the want of which chiefly startled new beginners.

Some have even made a kind of trade of selling; inasmuch, that from the year 1774 to the year 1792, no fewer than fifty sales have taken place, producing in all the sum of 849*l.* sterling. This proved from time to time a most seasonable recruit to the colony, and gave new vigour and spirits to the whole.

The number of the settlers is productive of an excellent effect; that although some are generally absent, enough still remain to occupy the water constantly. In a favourable day, there may be seen hundreds, men, women, and children, labouring with the utmost assiduity. The women declare they can make more by working at the moss than at their wheel; and such is the general attachment to that employment, that they have frequently been discovered working by moonlight.

Another happy consequence arising from their numbers is the great quantity of moss they consume for fuel. There are in all 115 families. Each family requires at an average 10 dargues (c) of peats yearly. Each dargue uncovers a space equal to 10 square yards of clay: so that, by casting peats, the moss tenants gain yearly about 6 roods of land.

The advantage, too, of providing their fuel with so little trouble, is very great. They require yearly 1150 dargues of peats; which, as each dargue when dried and stacked is valued at five shillings, are worth 287*l.* 10*s.* sterling; a sum which otherwise must have been expended on the prime cost and carriage of coals.—Many of them cast peats for sale; and 100*l.* worth are yearly disposed of in the town of Stirling, the village of Down, &c.

Though moss work be laborious, it is at the same time amusing. The operator moves the moss five feet only at a medium; and the water, like carts in other cases

(c) A dargue (or darg) of peats, is the quantity that one man can cast and two can wheel in a day to the field where they are spread out to dry.

Preparation of Land. cafes, carrying it off as fast as it is thrown in, excites him to activity. Still he must submit to be wet from morning to night. But habit reconciles him to this inconvenience; while his house and arable land fill his eye and cheer his mind. Nor is it found that the health of the inhabitants is in the smallest degree injured either by the nature of the work or the vicinity of the mofs.

The quantity of mofs that one man can move in a day is surprizing; when he meets with no interruption, seldom less than 48 cubic yards, each weighing 90 stones. The weight, then, of mofs moved *per* day is no less than 4320 stones. A cubic yard is moved into the water, and of course carried into the river Forth for one farthing. It follows, that the expence of moving 48 cubic yards is one shilling. But the same quantity moved to the same distance by carts would cost 24 shillings. Hence the advantage derived from the possibility of floating mofs in water, and the great importance of having water for that purpose.

The mofs, when contrasted with the rich lands surrounding, appeared, especially before the improvements, a very dreary spot; one wide unvaried wild, totally unproductive, unfit even to furnish sustenance to any animal, except here and there a few wretched straggling sheep. Besides, it entirely cut off all connexion betwixt the farms on either side; among which no intercourse was practicable but by a circuit of several miles.

The scene is already greatly changed. The following are the numbers of the inhabitants who some years ago resided in the mofs; also of their cows and horses, and of the acres gained by them from the mofs, together with their produce.

| | | | | |
|----------------------------------|---|---|-------|-----|
| Men | - | - | - | 115 |
| Women | - | - | - | 113 |
| Boys | - | - | - | 199 |
| Girls | - | - | - | 193 |
| | | | Total | 620 |
| Number of cows, at least, | - | - | - | 115 |
| Ditto of horses and carts | - | - | - | 34 |
| Ditto of acres cleared from mofs | - | - | - | 300 |

The produce in bolls cannot be exactly ascertained: but, considering the goodness of the soil, may be fairly stated at 8 bolls *per* acre. *Inde* 2400 bolls.

As oats are the staple commodity, the calculation shall be confined to that grain. According to the fairs of Stirlingshire, crop 1790, carse oats are valued at 14s. *per* boll. *Inde* 2400 bolls at 14s. is 1680l. Of late this price has at times been doubled.

A tract of ground so considerable, formerly a nuisance to the country, thus converted into a fertile field, filled with inhabitants, comfortable and happy, cannot surely be surveyed with an eye of indifference by any person whose mind is at all susceptible of feeling or of public spirit.

An excellent gravelled road, 20 feet wide and a mile and a half long, is now carried quite across the

mofs. By this means, in the first place, a short and easy intercourse is established between two considerable parts of the estate, formerly as little connected as if separated by a lake or an arm of the sea. Secondly, The inhabitants of the mofs, to whom, hitherto, all passage with carts or horses was impracticable for at least one half of the year, have now obtained the essential advantage of being able, with ease, to transport all the different commodities at every season of the year. This road was entirely formed by the hands of the mofs tenants, and gravelled by their own carts and horses: a work which, it will not be doubted, they performed with much alacrity; when it is considered that, to the prospect of procuring a lasting and material benefit to themselves, there was joined the additional inducement of receiving an immediate supply of money, the whole being done at the proprietor's expence.

The possessions are laid off in the manner best fitted for the operations; and are divided by lanes running in straight lines parallel to each other. Parallel to these again the drains are carried; and this straight direction greatly facilitates the progress of the water with its load of mofs. Upon the bank of mofs fronting the lanes, the operation of floating is begun; and twenty or thirty people are sometimes seen heaving mofs into the same drain. That the water may be the more conveniently applied, the lanes include between them the breadth of two possessions only. The new houses are erected upon each side of these lanes at the distance of 100 yards from each other.

Before the formation of lanes and roads, and while yet no ground was cleared, the first settlers were obliged to erect their houses upon the surface of the mofs. Its softness denied all access to stones; which, at any rate, are at such a distance as would render them too expensive. Settlers, therefore, were obliged to construct their houses of other materials. Upon the low mofs there is found for this purpose great plenty of sod or turf, which accordingly the tenants use for the walls of their houses. For the rudeness of the fabric nature in some measure compensates, by overspreading the outside with a luxuriant coating of heath and other moorish plants, which have a very picturesque appearance.

But upon the high mofs there is no sod to be found. There the tenant must go differently to work. Having chosen a proper situation for his house, he first digs four trenches down to the clay, so as to separate from the rest of the mofs a solid mass, containing an oblong rectangular area, sufficiently large for his intended house. This being done, he then scoops out the middle of the mass, leaving on all sides the thickness of three feet for walls; over which he throws a roof, such as that by which other cottages are commonly covered.

Upon the softest parts of the mofs, even these walls cannot be obtained. In such places the houses are built with peat dug out of the mofs, and closely compressed together while in a humid state (D). It is necessary

(D) This does not apply to the *morafs*, upon the surface of which, it has already been observed, it is impossible to erect houses in any shape.

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of Land.

cessary even to lay upon the surface a platform of boards to prevent the walls from sinking; which they have frequently done when that precaution was neglected. After all, to stamp with the foot will shake the whole fabric as well as the moss for fifty yards around. This, at first, startled the people a good deal; but custom soon rendered it familiar.

The colonists have now made considerable advancement in rearing better habitations for their comfort and convenience. Their huts of turf are but temporary lodgings. As soon as they have cleared a little ground, they build houses of brick: when the proprietor a second time furnishes them with timber gratis. It has also been found necessary to relieve them entirely from the payment of the burdensome tax upon bricks; a tax which surely was never intended to fall on such poor industrious adventurers; and which, without this assistance, would have proved a most effectual bar to the employment of these materials.

There are now erected in the moss 69 brick houses, substantially built with lime. The total expence amounted to 1033l. sterling. And it is a very comfortable circumstance, that the money expended upon these houses is mostly kept in circulation among the inhabitants themselves; for as a number of them have learned not only to manufacture but also to build bricks, and as others who have horses and carts furnish the carriage of lime and coals, they thus interchange services with each other.

With a view to excite the exertion of the colonists, the following premiums were also offered: 1. To the person who shall in the space of one year remove the greatest quantity of moss down to the clay, a plough of the best construction. 2. To the person who shall remove the next greatest quantity, a pair of harrows of the best kind. 3. For the next greatest quantity, a spade of the best kind, and 10lb. of red clover seed. But as these premiums, if contested for by the whole inhabitants, could reach but a very few of the number, they were therefore divided into six districts according to their situation; and the above premiums were offered to each district.

The establishment of this colony was no doubt attended with a very considerable share of expence and difficulty; for the undertaking was altogether new, and there were many prejudices against it, which it was necessary to overcome. At the same time it was noble and interesting: it was to make a valuable addition to private property: it was to increase the population of the country, and to give bread to a number of people; many of whom having been turned out of their farms and cottages in the Highlands, might otherwise, by emigration, have been lost to their country; and that too at a time when, owing to the great enlargement of farms, depopulation prevails but too much even in the low countries. And it was to add to the arable lands of the kingdom, making many thousand bolls of grain to grow where none ever grew before.

These considerations have hitherto preponderated with the proprietors against the various obstacles that present themselves to the execution of so extensive an undertaking. Should their example tend in any degree to stimulate others, who both in Scotland and in England possess much ground equally useless to the

country, to commence similar improvements, it would be a most grateful consideration superadded to the pleasure already arising from the progress of the infant colony.

After all, it will probably hereafter be thought, that the great efforts of ingenuity, and of persevering industry, which were requisite in the above operation, might all have been avoided, and the work much easier performed, had the art been found out of converting moss into fruitful soil, according to the plan practised, and undoubtedly brought to great perfection in Ayrshire, by the gentleman already mentioned, John Smith, Esq. of Swinridge Muir, near Reith. On a part of a moss in this gentleman's property, a quantity of lime had been spread in consequence of the miring of some carts in wet weather; to relieve which, their load was laid over the ground in their neighbourhood, though this was accounted at that period an absurd operation, as it was believed that lime would have the effect of consuming and rendering mossy ground useless for ever. The proprietor, Mr Smith, was then in the army, towards the close of the American war. On returning home the succeeding summer, and being informed of the accident, he was surprised to find that as good a crop grew upon the patch of moss on which the lime had been scattered, as upon another spot that had been pared and burned, in consequence of instructions that he had transmitted home for that purpose, from having perused some treatises in which burning of moss was recommended. He also remarked, that upon the places which had neither been burned nor limed, nothing grew, and that the crop upon the burned soil was inferior to that where the lime had been laid, being almost choked with sorrel. Mr Smith pursued the hint thus obtained: He reclaimed by means of lime every portion of moss in his own possession, and having satisfied his tenants of the utility of the practice, he allowed them to dig limestone gratis, and gave them the refuse of his coal at prime cost to burn it. Thus, in a short time, every part of the moss upon his estate was reduced under cultivation, and rendered highly valuable.

When Mr Smith began his operations, he met the fate of innovators in agriculture, that is, he was ridiculed by all his neighbours. His success, however, at length made some converts, and though the new system at first advanced slowly, it was at last universally approved of, and extensively imitated. The result has been, that what was once the worst land in the country, is now become the most productive and fertile.

The following is a concise statement of Mr Smith's practice, and consequently of the Ayrshire practice, of actually converting moss into vegetable mould, capable of bearing rich crops of corn, hay, potatoes, &c. which we shall give in the words of Mr Headrick.

"1. When they enter upon the improvement of a moss in its natural state, the first thing to be done is, to mark and cut main or master drains, eight feet in width, by four and a half in depth, and declining to two and a half at bottom; these cost 1s. per fall of six Scots ells. In some instances, it will be found necessary to cut those drains much deeper, consequently at a greater expence. These drains almost in every instance can be, and are so conducted, as to divide the field into regular and proper enclosures. They always make it a rule to finish off as much of a drain as they have

broken

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Mr Smith's
mode of
improving
moss.Communications to the
Board of
Agriculture,
vol. ii.

Preparation of Land. broken up, before they leave it at night; because, if a part is left dug, suppose half way, the oozing of water from the sides would render the bottom so soft, that they could neither stand upon it nor lift it with the spade. When the moss is so very soft, that the pressure of what is thrown out of the drain may cause its sides to fall in again, they throw the clods from the drain a considerable way back, and sometimes have a man to throw them still further back, by a spade or the hand; for this reason too, they always throw the stuff taken from a drain as equally as possible on each side of it. In digging the drains, the workmen stand upon small boards to prevent them from sinking, and move them forward as the work advances.

"When the moss lies in a hollow, with only one outlet, it is necessary to lead up a drain, so as to let the water pass this outlet, and then conduct it along the lowest or wettest part of the moss: this middle drain is afterwards sloped, and the stuff thrown back into the hollows that may occur; upon it the ridges are made to terminate on each side, while a ring drain, serving the purpose of a fence, is thrown round the moss at the line where the rising ground commences. This can generally be so managed as to divide the moss into a square field, leaving straight lines for the sides of the contiguous fields. The ring drain intercepts the surface water from the higher grounds, and conducts it into the lower part of the outlet, while the sloped drain in the centre receives and discharges all the water that falls upon the moss.

"After the moss collapses in consequence of liming and culture, it is often necessary to clean out these drains a second time, and to dig them to a greater depth: their sides become at last like a wall of peat, which few animals will venture to pass.

"2. The drains being thus completed, they mark out the ridges, either with a long string or with three poles set in a line. Mr Smith has tried several breadths of ridges, but now gives a decided preference to those that are seven yards in breadth. The ridges are formed with the spade in the following manner: In the centre of each intended ridge, a space of about two feet is allowed to remain untouched; on each side of that space a furrow is opened, which is turned over so as completely to cover that space, like what is called *veering* or *feering* of a gathered ridge; the work, thus begun, is continued by cutting furrows with the spade, and turning them over from end to end of the ridge on each side, until they arrive at the division furrows. The breadth of the slices thus cut, may be about 12 inches, and each piece is made as long as it may suit to turn over: the ridge when finished, has the appearance of having been done with a plough. The division furrow is two feet in breadth, which if necessary to draw off superfluous water, is partly cut and thrown upon the sides, or into hollows in the ridges on each side. The depth of the division furrows is regulated by circumstances so as not to lay the ridges at first too dry, but at the same time, to bleed, as it were, the moss, and conduct the superfluous water into the master drains.

"3. The next operation is to top-dress the ridges with lime. The sooner this is done after the ridges are formed, the better. When the moss appears dry, experienced farmers throw on the lime, but do not clean

out the division furrows until the ensuing winter. Preparation of Land. When it is soaked in water, they clean the division furrows as soon as the lime is ready, and after the water has run off apply the lime immediately. It is of great importance to have the lime applied while the moss is still moist, and the lime in as caustic a state as possible. For this purpose, they have the lime conveyed from the kiln in parcels, slaked and laid on as fast as the ridges are formed. Being dropped from carts, and slaked at the nearest accessible station, it is carried to the moss by two men on light handbarrows, having a hopper and bottom of thin boards, and there spread with shovels as equally as possible. During the first and second years, the crop is generally carried off in the same way. In some places where a moss is covered with coarse herbage, and accessible by carts in dry weather, I saw them give a good dose of lime to the moss before it was turned up with the spade, and another after the ridges were formed. It is surprising how quickly they execute these operations with the handbarrows. In other places where coarse boards can be procured, they lay a line of them along the crown of a ridge, and convey the lime upon them in wheelbarrows."

"The proportion of lime allowed to the acre is various, being from three to eight chalders. Improvers are much less sparing of this ingredient now than formerly, and much greater proportions have been applied with good effect. Suppose 120 bolls, or 480 Winchester bushels of slaked or powdered lime allowed to every Scots acre, this would cost at the sale kilns 40s.; and thus the reader may be enabled to calculate the expence of lime in this district at every given proportion: But most of the farmers here burn lime for themselves in vast kilns of sod, and think they have it much cheaper than it could be got from a sale kiln. In many places, limestone abounds so much, that houses, fences, and roads are constructed with it; and when a farmer burns the limestone within his premises, he at least saves the expence of carriage.

"In some cases, after the limestone is laid on, they go over the ground with hoes, or with spades, hacking and mangling the clods, and mixing the lime more completely with the superficial soil; but where there is much to do, and hands are scarce, they never think of these operations.

"4. The field thus prepared is ready to receive the seed, which is sown at the proper season whether it be *wet* or *dry*, and harrowed in with a small harrow drawn by two men. Four men will with ease harrow at least five or six roods *per* day, two and two dragging the harrow by turns, and two breaking and dividing the mould with spades. When the lime has been applied early the preceding summer, a good crop of oats may generally be expected; but if it has been recently applied, the first crop of oats frequently misgives, as the lime has not time to combine with the moss, and form it into a soil.

"The early Dutch or Polish oats are always preferred by moss improvers, as the common Scots or late oats are too apt to run into straw, and lodge before the grain arrives at maturity. The same proportion of seed is allowed per acre that is usual in other places. The great desideratum is, to procure plants which will throw up a sufficient quantity of herbage, so as to shield the

Preparation of Land. the surface from the winds and sun's rays, and thus to keep it moist during the first summer after a moss is reclaimed.

"This desideratum is effectually supplied by the potato, which thrives well on moss at all times, whether recently opened up and limed, or at any future period of its cultivation; only it requires a proportion of stable dung. It is now become the general practice in Ayrshire, to plant potatoes on those mosses which have been but recently turned up and limed; and where dung can be procured, it is generally the first crop on all their mosses.

"The method of planting potatoes, whether they be the first crop or succeed the first crop of oats, is by lazy beds. If they be the first crop, the moss having been delved into ridges, and limed as before directed, spaces of from five to six feet in breadth are marked out across the ridges, having intervals of about two feet, from which the moss is taken to cover the sets. These spaces or beds are covered over with a thin stratum of dung, laid upon the surface of the lime at the rate of about sixteen tons to the Scots acre. The cuttings of the potatoes are laid or placed upon the said beds, about ten or twelve inches asunder; and the whole are covered over with moss, taken from the intervals which are thus converted into ditches, to be followed by another covering about the time the potato plants begin to make their appearance, the covering in the whole amounting to about four or five inches; at the same time, the division furrows are cleaned out to cover the sets that are contiguous to them. The whole field is thus divided into spaces or lazy beds, like a chequered board. During summer, they cut the moss with hoes, and draw it up a little towards the stems of the plants. Few weeds appear, except what are conveyed by the dung. This is the practice universally followed when potatoes are planted on moss for the first time; but after the moss is finely pulverized and reduced, they either plant them in rows across the ridges, or plant and dress them with the plough in the usual manner.

"Potatoes planted as the first crop never misgive, and they are the best and most certain method at once to reclaim a moss, not owing so much perhaps to the dung aiding the putrid fermentation which the lime has already excited, as to their roots pushing and dividing the moss, while their leaves shelter it from the sun, cause a stagnation of air, and thus keep it in that degree of moisture which is most favourable to the action of lime upon moss. The practice of making potatoes the first crop is now universally followed, in so far as the farmers can command dung. The produce is from 40 to 60 bolls per acre, the potato measure being eight Winchester bushels a little heaped to the boll. Mosses that are fully reclaimed yield from 60 to 70 bolls of potatoes at an average, and in some places where manures are abundant, they have been known to yield from 80 to 100 bolls per acre, of the above measure.

"Mr Smith is about to try yams upon his mosses, from the opinion that prevails among some of the Mid-Lothian farmers, where this plant is much cultivated, that they require little or no dung, and that the superior breadth of their leaves, will prove more favourable than those of potatoes, for sheltering the ground.

Preparation of Land. "When the potato crop is removed, the ridges are again put into their original form; in doing which, care is taken to preserve the mould that is acquired uppermost; this is done by moving the subfurrow on each side with a strong spade, half way into the intermediate ditch from which the lazy beds were covered, and scattering the mould equally over the whole surface. This operation costs 18s. per acre. It is not easy to calculate the expence of planting the potatoes forming the lazy beds, &c. as this is seldom executed by contract; but the lazy beds being thus reduced, the land is ready for a crop of corn.

"Though a crop of oats frequently misgives upon moss that has been but recently limed, yet in other cases, when the lime has lain several months upon the land, it proves a good crop, and is sufficient to cover all the expence with a little profit. The crops of succeeding years are sufficient to afford from their straw putrescent manure for such land in order that it may be cleaned with potatoes, and prepared for grass seeds.

"But after potatoes of the first year, with the slight operation of reducing the lazy-beds, from 10 to 12 bolls of oats are at an average produced per acre. The oats are excellent, and yield from 18 to 20 pecks of meal per boll; they would sell upon the ground for 10l. or 12l. per acre. The ground continues to yield oats of the same quality for several years, without any apparent diminution of fertility, and without receiving any additional manure: the only apparent bar to the continuance of this crop is, the soil becoming grassy. When the grass begins to contend with the crop for pre-eminence, the land is thrown into pasture, and would let ever after in that state at from 20s. to 25s. per acre. Daisies, white clover, &c. &c. now spring up in mosses, where their existence was never before suspected; at the same time, thistles and other weeds for some time infest the pasture.

"The better practice is, to take another crop of potatoes with a little dung and lime, and give it a trench-deling, to bury the weeds and bring up new soil; after the potatoes, to sow barley and grass seeds.

"Rye-grass is universally sown here, and it attains amazing perfection upon moss properly prepared; along with this, white and yellow clover are sometimes sown, and thrive remarkably well. Red clover has been tried, but did not succeed, and is hence discredited for moss-lands: perhaps it may have been unjustly censured, because it is certain that the seasons in which it was tried, proved very unfavourable to red clover in all parts of the country, most of it having died during winter.

"5. We have already described the levelling of the lazy beds. All future delvings of the moss are performed from one end of the ridge to the other; by this method the slices that had been cut and turned over in the first operation of forming the ridge, are again cut across, and constantly reduced into smaller pieces, till they moulder into earth.

"The expence of delving a moss for the first time, where the surface is tolerably smooth, is 2½d. per fall, or 1l. 13s. 4d. per Scots acre; but where inequalities occur, which must be thrown down by the spade into hollows, it costs about 2l. per acre. If there be eminences, which must be removed into hollows by wheelbarrows running upon boards, the first expence is great-

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er according to circumstances. The second delving, where potatoes have not intervened, costs from 1l. to 1l. 6s. *per* Scots acre, the division-furrows being at the same time cleaned out. The third delving and cleaning of the division-furrows costs 1l. *per* acre; but the moss is now so friable, that it may be wrought with the greatest ease and rapidity. At the above rates, an ordinary workman will earn 1s. 6d. *per* day, and an able and experienced one, from that to 2s. 6d. *per* day. They use a strong spade, edged with steel, and have always a griststone near them for sharpening the spade. In the evenings they repair its edge upon a grindstone; and when the steel is worn away, they lay it again with new steel. Sometimes the moss is so soft that they walk upon boards while they are turning it over.

“Mr Smith has found, by long experience, that it is improper to make the ridges too high or too narrow: when they are too high, they throw the water off from their sides without admitting it to penetrate their substance; and the top of course gets too dry: when too narrow, there is a loss of surface from too many division-furrows: the breadth already mentioned is found to be the best: and when the improvement is completed, the ridges appear like segments of wide circles, with a clean well defined division-furrow between each of them. The moisture is thus caused slowly to filtrate through the moss rendered friable by lime until it reaches the division-furrows, and is discharged. As the moss subsides for some time, and closes in towards the furrows, it is generally necessary to clean these out before winter, and at the time the crop is sown, until the moss acquire solidity.

“Some mosses may be ploughed the second year to within two bouts or four slices of the division-furrows, and every operation performed by the force of horses, except turning over with the spade the narrow stripes next to the division-furrows. In other mosses it requires three years before this can be done; and it seldom happens but every moss may be wrought by the plough after it has been wrought four years by the spade. When moss is wrought by the spade, it seems of no consequence whether it be wrought wet or dry; but when it is wrought by the plough, opportunities must be watched, as horses cannot walk upon it for some years during wet weather.

“6. With respect to the quality of the potatoes thus produced upon mosses, I do not scruple to pronounce it most excellent. Potatoes have been tried with dung alone; but they are always watery, and frequently hollow or rotten in the heart: those raised upon mosses that have been well limed, are frequently so dry and farinaceous, that it is difficult to boil them without reducing them to powder; and they are often obliged to lift them with spoons: they come clean out of the ground; keep remarkably well in heaps covered with moss in the field; and are remarkably well flavoured.

“No such disease as the curl was ever known among moss potatoes; and, indeed, if Dr Coventry’s opinion be true, that the curl is caused by overloading the sets with too much earth, or from the earth becoming too hard around them; no such thing can take place in moss. But to whatever cause the curl may be owing, it is certainly propagated by diseased seed; it would, therefore, appear advantageous to transfer the potatoes raised upon moss as seed for solid land. They

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have a remarkably good species of potato in this district, which was brought from Virginia to Largs about eight years ago; and whether it be owing to the beneficial nature of a mossy soil, or to its own intrinsic merits, this potato has long been so much distinguished by the good quality and large quantity of its produce, that it has superseded the use of every other species. There seems to be no occasion for moss improvers to change their seed. Some persons in this district, who have but small patches of moss, have kept them constantly in potatoes more than ten years, without changing the seed, and without any sensible diminution either in the quantity or quality of the crop.”

4. Of bringing LAND into CULTURE from a State of Nature.

To improve a moor, let it be opened, if possible, in winter, when it is wet, which has one convenience, that the plough cannot be employed in any other work. It is always supposed, however, that the moisture has been sufficiently removed by draining, to render this practicable. In spring, after the frost is over, a slight harrowing will fill up the interstices with mould, to keep out the air and rot the sod. Thus it may be suffered to lie during the following summer and winter, which will tend more to rot the turf than if laid open to the air by ploughing. Next April, let it be cross-ploughed, braked, and harrowed, till it be sufficiently pulverized for turnip-seed, to be sown broadcast, or in drills, after being manured, and the manure mixed with the soil by repeated harrowings.

It sometimes happens, however, that the heath which grows upon a moorish soil, is so strong and vigorous as to be subdued with great difficulty. It has been observed, that after land is drained and the heath burnt upon the surface, this plant is in time extirpated by sheep. These animals are extremely fond of the tender shoots and flowers of heath, but they will not taste it after it runs into seed, unless compelled by extreme hunger. For subduing it by a shorter process, lime is the best remedy, as it seems a mortal enemy to heath. A strong dose of caustic lime therefore laid upon the surface of the land after it is first ploughed, is attended with the best effect in consuming the roots of heath and of coarse grasses, and rendering the soil friable, which it accomplishes in about six months. Economy in the use of this ingredient, therefore, at the first breaking up of moor land, is extremely misapplied. Accordingly some skilful farmers lay one dose of lime upon the land before it is ploughed, and another after it, that the furrow slices, being wholly surrounded by it, may be sooner brought into a friable state. But, although a very considerable dose of lime is absolutely necessary, when such land is newly reduced from a state of nature, it ought not to be solely trusted to. To render the land permanently fertile, it soon becomes necessary to aid the soil, by vegetable or putrescent manure.

The turnip crop may be consumed upon the ground by sheep, which affords an excellent preparation for laying down the field with grass seeds; a point which every improver ought to have in view, on account of the command of dung which it gives him. It is even said to be an improvement upon this method, to take two or even three successive crops of turnips, all consumed

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fumed in the same way. No dung will be necessary for the two last crops, and the soil will be greatly thickened and enriched.

With regard to swampy lands and a soil covered with rushes, ant hills, and coarse grasses; after draining, the best procedure which can be adopted, consists of paring and burning. When land is pared, a thin sod is taken off, either by a paring spade or paring plough, over the whole surface. The sods being dried, are collected into small heaps and burned, and the ashes are scattered over the field. Swampy land that is overrun with rushes and coarse grasses, and lands that are covered with heath and other coarse plants, suit best for paring and burning. In this way these coarse plants are destroyed at once, and the land may be ploughed and cropped immediately, without waiting for the rotting of the turf, as in the former case. It is also said, that this practice destroys all slugs and other vermin that infest the soil. It is more especially valuable in situations where lime and other manures cannot be procured. Where lime is to be found in abundance, however, it might probably be a better practice, instead of burning the turf that has been cut from the surface of the coarse land, to collect it all into heaps in different parts of the field, and make it up into compost with lime. The whole heaps in such cases ought to be thoroughly moistened, and the mass to be frequently turned and mixed. In this way, by using lime in place of fire, the whole roots and coarse herbage would be destroyed, and reduced at once into a most valuable manure for enriching the soil. In the mean time it is to be observed, that paring and burning is so evidently advantageous to the immediately succeeding crops, that it has sometimes been abused by overcropping after it, and by extending it, perhaps unnecessarily, to all soils, upon breaking them up from grass, though formerly cultivated and in good order: though even in such cases it may be found valuable, where lime cannot easily be obtained. The following remarks upon the subject, in the Report of the Agriculture of the county of Northumberland, by J. Bayley and G. Culley, are worthy of attention. "Paring and burning is not much practised in the eastern and northern parts of the county: in the middle and southern parts it is most prevalent; but, even there, it is confined to old swards, and coarse, rough, rushy, and heathy lands. For the first breaking up of such ground, it is certainly very convenient, and preferable to any other mode we have ever seen; but though we are fully convinced of its beneficial effects in such situations, yet we have our doubts whether it could be used with advantage upon lands that have lain a few years in grass, and that would produce good crops of grain immediately on being ploughed out, which is not the case with coarse rough heathy lands, or even very old swards on rich fertile soils; it being found that crops on the latter are frequently very much injured by *leaping* for two or three years, which paring and burning entirely obviate, and ensure full crops to the farmer, who need not be under any apprehension of his soil being ruined by it, provided he pursue the following course: 1. Turnips; 2. Oats; 3. Fallow well limed for turnips; 4. Barley sown up with clover and grass seeds, and depastured with sheep for three or four years. It is the injudicious cropping, more than the

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Paring and
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how far
useful.

ill effects derived from paring and burning, that has been the chief cause of bringing such an odium on this practice, which is certainly an excellent one in some situations, and when properly conducted; but, like the fermented juice of the grape, may be too often repeated and improperly applied.

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"The popular clamour against this practice, "that it destroys the soil," we can by no means admit; and are inclined to believe, that not a single atom of soil is abstracted, though the bulk of the sod or turf be diminished. This arises from the burning of the roots or vegetable substances, which, by this process, afford a considerable portion of alkaline salts, phlogistic or carbonic matter, and probably other principles friendly to vegetation; as we find those ashes produce abundant crops of turnips, which fatten stock much quicker than those after any other dressing or manure we have ever seen; and the succeeding crops of corn are so very luxuriant as to tempt the injudicious cultivator to pursue it too far; who, for the sake of a temporary gain, may be said to rip it up, as the boy did his goose that laid golden eggs."

But where the ground is dry, and the soil so thin as that the surface cannot be pared, the best way of bringing it into tilth from the state of nature, as mentioned above, is to plough it with a feathered sock, laying the grassy surface under. After the new surface is mellowed with frost, fill up all the seams by harrowing cross the field, which by excluding the air will effectually rot the sod. In this state let it lie summer and winter. In the beginning of May after, a cross ploughing will reduce all to small square pieces, which must be pulverized with the brake, and make it ready for a May or June crop. If these square pieces be allowed to lie long in the sap without breaking, they will become tough, and not be easily reduced.

5. Forming RIDGES.

The first thing that occurs on this head, is to consider what grounds ought to be formed into ridges, and what ought to be tilled with a flat surface. Dry soils, which suffer by lack of moisture, ought to be tilled flat, which tends to retain moisture. And the method for such tilling, is to go round and round from the circumference to the centre, or from the centre to the circumference. This method is advantageous in point of expedition, as the whole is finished without once turning the plough. At the same time, every inch of the soil is moved, instead of leaving either the crown or the furrow unmoved, as is commonly done in tilling ridges. Clay soil, which suffers by water standing on it, ought to be laid as dry as possible by proper ridges. A loamy soil is the middle between the two mentioned. It ought to be tilled flat in a dry country, especially if it incline to the soil first mentioned. In a moist country, it ought to be formed into ridges, high or low according to the degree of moisture and tendency to clay.

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Of ridges.

In grounds that require ridging, an error prevails, that ridges cannot be raised too high. High ridges labour under several disadvantages. The soil is heaped upon the crown, leaving the furrows bare: the crown is too dry, and the furrows too wet: the crop, which is always best on the crown, is more readily shaken with the wind, than where the whole crop is of an equal

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equal height: the half of the ridge is often covered from the sun, a disadvantage which is far from being slight in a cold climate. High ridges labour under another disadvantage, in ground that has no more level than barely sufficient to carry off water: they sink the furrows below the level of the ground; and consequently retain water at the end of every ridge. The furrows ought never to be sunk below the level of the ground. Water will more effectually be carried off by lessening the ridges both in height and breadth: a narrow ridge, the crown of which is but 18 inches higher than the furrow, has a greater slope than a very broad ridge where the difference is three or four feet.

Next, of forming ridges where the ground hangs considerably. Ridges may be too steep as well as too horizontal: and if to the ridges be given all the steepness of a field, a heavy shower may do irreparable mischief. To prevent such mischief, the ridges ought to be so directed cross the field, as to have a gentle slope for carrying off water slowly, and no more. In that respect, a hanging field has greatly the advantage of one that is nearly horizontal; and because, in the latter, there is no opportunity of a choice in forming the ridges. A hill is of all the best adapted for directing the ridges properly. If the soil be gravelly, it may be ploughed round and round, beginning at the bottom and ascending gradually to the top in a spiral line. This method of ploughing a hill requires no more force than ploughing on a level; and at the same time removes the great inconvenience of a gravelly hill, that rains go off too quickly; for the rain is retained in every furrow. If the soil be such as to require ridges, they may be directed to any slope that is proper.

In order to form a field into ridges that has not been formerly cultivated, the rules mentioned are easily put in execution. But what if ridges be already formed, that are either crooked or too high? After seeing the advantage of forming a field into ridges, people were naturally led into an error, that the higher the better. But what could tempt them to make their ridges crooked? Certainly this method did not originate from design; but from the laziness of the driver suffering the cattle to turn too hastily, instead of making them finish the ridge without turning. There is more than one disadvantage in this slovenly practice. First, the water is kept in by the curve at the end of every ridge, and sours the ground. Next, as a plough has the least friction possible in a straight line, the friction must be increased in a curve, the back part of the mouldboard pressing hard on the one hand, and the coulter pressing hard on the other. In the third place, the plough moving in a straight line, has the greatest command in laying the earth over. But where the straight line of the plough is applied to the curvature of a ridge in order to heighten it by gathering, the earth moved by the plough is continually falling back, in spite of the most skilful ploughman.

The inconveniences of ridges high and crooked are so many, that one would be tempted to apply a remedy at any risk. And yet, if the soil be clay, it would not be advisable for a tenant to apply the remedy upon a lease shorter than two nineteen years. In a dry gravelly soil, the work is not difficult nor hazardous. When the ridges are cleaved two or three years successively in the course of cropping, the operation ought

to be concluded in one summer. The earth, by reiterated ploughings, should be accumulated upon the furrows, so as to raise them higher than the crowns: they cannot be raised too high, for the accumulated earth will subside by its own weight. Cross ploughing once or twice, will reduce the ground to a flat surface, and give opportunity to form ridges at will. The same method brings down ridges in clay soil: only let care be taken to carry on the work with expedition; because a hearty shower, before the new ridges are formed, would soak the ground in water, and make the farmer suspend his work for the remainder of that year at least. In a strong clay, we would not venture to alter the ridges, unless it can be done to perfection in one season. On this subject Mr Anderlon has the following observations*.

"The difficulty of performing this operation properly with the common implements of husbandry, and the obvious benefit that accrues to the farmer from having his fields level, has produced many new inventions of ploughs, harrows, drags, &c. calculated for speedily reducing the fields to that state; none of which have as yet been found fully to answer the purpose for which they were intended, as they all indiscriminately carry the earth that was on the high places into those that were lower; which, although it may in some cases render the surface of the ground tolerably smooth and level, is usually attended with inconveniences far greater, for a considerable length of time, than that which it was intended to remove.

"For experience sufficiently shows, that even the best vegetable mould, if buried for any length of time so far beneath the surface as to be deprived of the benign influences of the atmosphere, loses its *vis vitæ*, if I may be allowed that expression; becomes an inert, lifeless mass, little fitted for nourishing vegetables; and constitutes a soil very improper for the purposes of the farmer. It therefore behoves him, as much as in him lies, to preserve, on every part of his fields, an equal covering of that vegetable mould that has long been uppermost, and rendered fertile by the meliorating influence of the atmosphere. But, if he suddenly levels his high ridges by any of these mechanical contrivances, he of necessity buries all the good mould that was on the top of the ridges in the old furrows; by which he greatly impoverishes one part of his field, while he too much enriches another; inasmuch that it is a matter of great difficulty, for many years thereafter, to get the field brought to an equal degree of fertility in different places; which makes it impossible for the farmer to get an equal crop over the whole of his field by any management whatever: and he has the mortification frequently, by this means, to see the one half of his crop rotted by an over-luxuriance, while other parts of it are weak and sickly, or one part ripe and ready for reaping, while the other is not properly filled; so that it were, on many occasions, better for him to leave his whole field reduced at once to the same degree of poorness as the poorest of it, than have it in this state. An almost impracticable degree of attention in spreading the manures may indeed in some measure get the better of this: but it is so difficult to perform this properly, that I have frequently seen fields that had been thus levelled, in which, after thirty years of continued culture and repeated dressings, the marks of the old

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ridges could be distinctly traced when the corn was growing, although the surface was so level that no traces of them could be perceived when the corn was off the ground.

“But this is a degree of perfection in levelling that cannot be usually attained by following this mode of practice; and, therefore, is but seldom seen. For all that can be expected to be done by any levelling machine, is to render the surface perfectly smooth and even in every part, at the time that the operation is performed: but as, in this case, the old hollows are suddenly filled up with loose mould to a great depth, while the earth below the surface upon the heights of the old ridges remains firm and compact, the new raised earth after a short time subsides very much, while the other parts of the field do not sink at all; so that in a short time the old furrows come to be again below the level of the other parts of the field, and the water of course is suffered in some degree to stagnate upon them; inasmuch that, in a few years, it becomes necessary once more to repeat the same levelling process, and thus renew the damage that the farmer sustains by this pernicious operation.

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Levelling
sometimes
not to be
attempted.

“On these accounts, if the farmer has not a long lease, it will be found in general to be much his interest to leave the ridges as he found them, rather than to attempt to alter their direction; and, if he attends with due caution to moderate the height of these old ridges, he may reap very good crops, although perhaps at a somewhat greater expence of labour than he would have been put to upon the same field, if it had been reduced to a proper level surface, and divided into straight and parallel ridges.

“But, where a man is secure of possessing his ground for any considerable length of time, the advantages that he will reap from having level and well laid out fields, are so considerable as to be worth purchasing, if it should even be at a considerable expence. But the loss that is sustained at the beginning, by this mechanical mode of levelling ridges, if they are of considerable height, is so very great, that it is perhaps doubtful if any future advantages can ever fully compensate it. I would therefore advise, that all this levelling apparatus should be laid aside; and the following more efficacious practice be substituted in its stead: A practice that I have long followed with success, and can safely recommend as the very best that has yet come to my knowledge.

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First men-
tion of
levelling.

“If the ridges have been raised to a very great height, as a preparation for the ensuing operations, they may be first *cloven*, or *scalded* out, as it is called in different places; that is, ploughed so as to lay the earth on each ridge from the middle towards the furrows. But if they are only of a moderate degree of height, this operation may be omitted. When you mean to proceed to level the ground, let a number of men be collected, with spades, more or fewer as the nature of the ground requires, and then let a plough draw a furrow directly across the ridges of the whole field intended to be levelled. Divide this line into as many parts as you have labourers, allotting to each one ridge or two, or more or less, according to their number, height, and other circumstances. Let each of the labourers have orders, as soon as the plough has passed that part assigned him, to begin to dig in the

bottom of the furrow that the plough has just made, about the middle of the side of the old ridge, keeping his face towards the old furrow, working backwards till he comes to the height of the ridge; and then turn towards the other furrow, and repeat the same on the other side of the ridge, always throwing the earth that he digs up into the deep old furrow between the ridges, that is directly before him; taking care not to dig deep where he first begins, but to go deeper and deeper as he advances to the height of the ridge, so as to leave the bottom of the trench he thus makes across the ridge entirely level, or as nearly so as possible. And when he has finished that part of the furrow allotted to him that the plough has made in going, let him then go and finish in the same manner his own portion of the furrow that the plough makes in returning. In this manner, each man performs his own task through the whole field, gradually raising the old furrows as the old heights are depressed. And, if an attentive overseer is at hand, to see that the whole is equally well done, and that each furrow is raised to a greater height than the middle of the old ridges, so as to allow for the subsiding of that loose earth, the operation will be entirely finished at once, and never again need to be repeated.

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“In performing this operation, it will always be proper to make the ridges, formed for the purpose of levelling, which go across the old ridges, as broad as possible; because the deep trench that is thus made in each of the furrows are an impediment in the future operations, as well as the height that is accumulated in the middle of each of these ridges; so that the fewer there are of these, the better it is. The farmer, therefore, will do well to advert to this in time, and begin by forming a ridge by always turning the plough to the right hand, till it becomes of such a breadth as makes it very inconvenient to turn longer in that manner; and then, at the distance of twice the breadth of this new-formed ridge from the middle of it, mark off a furrow for the middle of another ridge, turning round it to the right hand, in the same manner as was done in the former, till it becomes of the same breadth with it; and then, turning to the left hand, plough out the interval that was left between the two new-formed ridges. By this mode of ploughing, each ridge may be made of 40, 50, or 60 yards in breadth, without any great inconvenience; for although some time will be lost in turning at the ends of these broad ridges, yet as this operation is only to be once performed in this manner, the advantage that is reaped by having few open furrows, is more than sufficient to counterbalance it. And, in order to moderate the height that would be formed in the middle of each of these great ridges, it will always be proper to mark out the ridges, and draw the furrow that is to be the middle of each, some days before you collect your labourers to level the field; that you may, without any hurry or loss of labour, clear out a good trench through the middle of each of the old ridges; as the plough, at this time, going and returning nearly in the same track, prevents the labourers from working properly without this precaution.

“If these rules are attended to, your field will be at once reduced to a proper level, and the rich earth that formed the surface of the old ridges be still kept upon
the

Preparation of Land. the surface of your field; so that the only loss that the possessor of such ground can sustain by this operation, is merely the expence of performing it."

He afterwards makes a calculation of the different expences of levelling by the plough and by the spade, in which he finds the latter by far the cheapest method.

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Proper direction of the ridges.

Let it be a rule to direct the ridges north and south, if the ground will permit. In this direction, the east and west sides of the ridges, dividing the sun equally between them, will ripen at the same time.

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Narrow ridges an advantage.

It is a great advantage in agriculture, to form ridges so narrow, and so low, as to admit the crowns and furrows to be changed alternately every crop. The soil nearest the surface is the best; and by such ploughing, it is always kept near the surface, and never buried. In high ridges, the soil is accumulated at the crown and the furrows left bare. Such alteration of crown and furrow is easy where the ridges are no more but seven or eight feet broad. This mode of ploughing answers perfectly well in sandy and gravelly soils, and even in loam; but it is not safe in clay soil. In that soil, the ridges ought to be 12 feet wide, and 20 inches high; to be preferred always in the same form by casting, that is, by ploughing two ridges together, beginning at the furrow that separates them, and ploughing round and round till the two ridges be finished. By this method, the separating furrow is raised a little higher than the furrows that bound the two ridges. But at the next ploughing, that inequality is corrected, by beginning at the bounding furrows, and going round and round till the ploughing of the two ridges be completed at the separating furrow.

6. CLEARING GROUND OF WEEDS.

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Cleaning harrow. Plate VIII. fig. 6.

For this purpose a new instrument, termed a *cleaning harrow*, has been introduced by Lord Kames, and is strongly recommended (F). It is one entire piece like the first of those mentioned above, consisting of seven bulls, four feet long each, two and one-fourth inches broad, two and three-fourths deep. The bulls are united together by sheths, similar to what are mentioned above. The intervals between the bulls being three and three-fourths inches, the breadth of the whole harrow is three feet five inches. In each bull are inserted eight teeth, each nine inches free below the wood, and distant from each other six inches. The weight of each tooth is a pound, or near it. The whole is firmly bound by an iron plate from corner to corner in the line of the draught. The rest is as in the harrows mentioned above. The size, however, is not invariable. The cleaning harrow ought to be larger or less according as the soil is stiff or free.

To give this instrument its full effect, stones of such a size as not to pass freely between the teeth ought to be carried off, and clods of that size ought to be broken. The ground ought to be dry, which it commonly is in the month of May.

In preparing for barley, turnip, or other summer-crop, begin with ploughing and cross ploughing. If the ground be not sufficiently pulverized, let the great

brake be applied, to be followed successively with the 1st and 2d harrows. In stiff soil, rolling may be proper, once or twice between the acts. These operations will loosen every root, and bring some of them to the surface. This is the time for the 3d harrow, conducted by a boy mounted on one of the horses, who trots smartly along the field, and brings all the roots to the surface: there they are to lie for a day or two, till perfectly dry. If any stones or clods remain, they must be carried off in a cart. And now succeeds the operation of the cleaning harrow. It is drawn by a single horse, directed by reins, which the man at the opposite corner puts over his head, in order to have both hands free. In this corner is fixed a rope, with which the man from time to time raises the harrow from the ground, to let the weeds drop. For the sake of expedition, the weeds ought to be dropt in a straight line cross the field, whether the harrow be full or not; and seldom is a field so dirty, but that the harrow may go 30 yards before the teeth are filled. The weeds will be thus laid in parallel rows, like those of hay raked together for drying. A harrow may be drawn swiftly along the rows, in order to shake out all the dust; and then the weeds may be carried clean off the field in carts. But we are not yet done with these weeds: instead of burning, which is the ordinary practice, they may be converted into useful manure, by laying them in a heap with a mixture of hot dung to begin fermentation. At first view, this way of cleaning land will appear operose; but, upon trial, neither the labour nor expence will be found immoderate. At any rate, the labour and expence ought not to be grudged; for if a field be once thoroughly cleaned, the seasons must be very cross, or the farmer very indolent, to make it necessary to renew the operation in less than 20 years. In the worst seasons, a few years pasture is always under command; which effectually destroys triennial plants, such as thistles and couch grass.

Preparation of Land. Plate VIII. fig. 3, 4. Fig. 5.

7. On the Nature of different Kinds of SOILS, and the PLANTS proper to each.

1. Clay, which is in general the stiffest of all soils, and contains an unctuous quality. But under the term *clays*, earths of different sorts and colours are included. One kind is so obtinate, that scarcely any thing will subdue it; another is so hungry and poor, that it absorbs whatever is applied, and turns it into its own quality. Some clays are fatter than others, and the fatter are the best; some are more soft and slippery. But all of them retain water poured on their surface, where it stagnates, and chills the plants, without sinking into the soil. The closeness of clay prevents the roots and fibres of plants from spreading in search of nourishment. The blue, the red, and the white clay, if strong, are unfavourable to vegetation. The stony and looser sorts are less so; but none of them are worth any thing till their texture is so loosened by a mixture of other substances, and opened, as to admit the influence of the sun, the air, and frosts. Among the manures recommended for clay, sand is of all!

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Clay soils

(F) In his *Gentleman Farmer*; to which performance the practical part of this article is materially indebted.

Preparation of Land. all others to be preferred; and sea sand is the best of all where it can be obtained: This most effectually breaks the cohesion.

The reason for preferring sea sand is, that it is not formed wholly (as most other sands are) of small stones; but contains a great deal of calcareous matter in it, such as shells grated and broken to pieces by the tide, and also of salts. The smaller the sand is, the more easily it penetrates the clay; but it abides less time in it than the larger.

The next best sand is that washed down by rains on gravelly soils. Those which are dry and light are the worst. Small gritty gravel has also been recommended by the best writers on agriculture for these soils; and in many instances we have found it to answer the purpose.

Shell marl, ashes, and all animal and vegetable substances, are very good manures for clay; but they have been found most beneficial when sand is mixed with them. Lime has been often used; but the writer of this section would not recommend it, for he never found any advantage from it singly, when applied to clays.

The crops most suitable for such lands are, wheat, beans, cabbages, and rye-grass. Clover seldom succeeds, nor indeed any plants whose roots require depth and a wide spread in the earth.

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Chalky soil.

2. Chalk. Chalky soils are generally dry and warm, and if there be a tolerable depth of mould, fruitful; producing great crops of barley, rye, pease, vetches, clover, trefoil, burnet, and particularly sainfoin. The latter plant flourishes in a chalky soil better than any other. But if the surface of mould be very thin, this soil requires good manuring with clay, marl, loam, or dung. As these lands are dry, they may be sown earlier than others.

When your barley is three inches high, throw in 10lb. of clover, or 15lb. of trefoil, and roll it well. The next summer mow the crop for hay; feed off the aftermath with sheep; and in winter give it a top-dressing of dung. This will produce a crop the second spring, which should be cut for hay. As soon as this crop is carried off, plough up the land, and in the beginning of September sow three bushels of rye per acre, either to feed off with sheep in the spring or to stand for harvest. If you feed it off, sow winter vetches in August or September, and make them into hay the following summer. Then get the land into as fine tilth as possible, and sow it with sainfoin, which, with a little manure once in two or three years, will remain and produce good crops for 20 years together.

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Light poor soil.

3. Light poor land, which seldom produces good crops of any thing till well manured. After it is well ploughed, sow three bushels of buck-wheat per acre, in April or May: When in bloom, let your cattle in a few days to eat off the best, and tread the other down; this done, plough in what remains immediately. This will soon ferment and rot in the ground; then lay it fine, and sow three bushels of rye per acre. If this can be got off early enough, sow turnips; if not, winter vetches to cut for hay. Then get it into good tilth, and sow turnip-rooted cabbages, in rows three feet apart. This plant seldom fails, if it has sufficient room, and the intervals be well horse-hoed;

and you will find it the best spring feed for sheep when turnips are over.

Preparation of Land.

The horse-hoeing will clean and prepare the land for sainfoin; for the sowing of which April is reckoned the best season. The usual way is to sow it broad-cast, four bushels to an acre; but the writer prefers sowing it in drills two feet asunder; for then it may be horse-hoed, and half the feed will be sufficient.

The horse-hoeing will not only clean the crop, but earth up the plants, and render them more luxuriant and lasting.

If you sow it broad-cast, give it a top-dressing in December or January, of rotten dung or ashes, or, which is still better, of both mixed up in compost.

From various trials, it is found that taking only one crop in a year, and feeding the after-growth, is better than to mow it twice. Cut it as soon as it is in full bloom, if the weather will permit. The hay will be the sweeter, and the strength of the plants less impaired, than if it stand till the feed is formed.

4. Light rich land, being the most easy to cultivate to advantage, and capable of bearing most kinds of grain, pulse, and herbage, little need be said upon it. ²¹²Light rich land.

One thing however is very proper to be observed, that such lands are the best adapted to the drill husbandry, especially where machines are used, which require shallow furrows to be made for the reception of the seed. This, if not prone to couch grass, is the best of all soils for lucerne; which, if sown in two feet drills, and kept clean, will yield an astonishing quantity of the most excellent herbage. But lucerne will never be cultivated to advantage where couch grass and weeds are very plentiful; nor in the broad-cast method, even where they are not so; because horse-hoeing is essential to the vigorous growth of this plant.

5. Coarse rough land. ²¹³Coarse rough land.

Plough deep in autumn; when it has lain two weeks, cross-plough it, and let it lie rough through the winter. In March give it another good ploughing; drag, rake, and harrow it well, to get out the rubbish, and sow four bushels of black oats per acre if the soil be wet, and white oats if dry. When about four inches high, roll them well after a shower: This will break the clods; and the fine mould falling among the roots of the plants will promote their growth greatly.

Some sow clover and rye-grass among the oats, but this appears to be bad husbandry. If you design it for clover, sow it single, and let a coat of dung be laid on in December. The snow and rain will then dilute its salts and oil, and carry them down among the roots of the plants. This is far better than mixing the crops on such land, for the oats will exhaust the soil so much that the clover will be impoverished. The following summer you will have a good crop of clover; which cut once, and feed the after-growth. In the winter plough it in, and let it lie till February: Then plough and harrow it well; and in March, if the soil be moist, plant beans in drills of three feet, to admit the horse-hoe freely. When you horse-hoe them a second time, sow a row of turnips in each interval, and they will succeed very well. But if the land be strong enough for sowing wheat as soon as the beans are off, the turnips may be omitted.

SECT. III. Culture of particular Plants.

THE articles hitherto objected on, are all of them preparatory to the capital object of a farm, that of raising plants for the nourishment of man and of other animals. These are of two kinds; culmiferous and leguminous; differing widely from each other. Wheat, rye, barley, oats, rye-grass, are of the first kind: of the other kind are, pease, beans, clover, cabbage, and many others.

²¹⁴ Culmiferous plants. Culmiferous plants, says Bonnet, have three sets of roots. The first issue from the seed, and push to the surface an upright stem; another set issue from a knot in that stem; and a third from another knot, nearer the surface. Hence the advantage of laying seed so deep in the ground as to afford space for all the sets.

²¹⁵ Leguminous plants. Leguminous plants form their roots differently. Pease, beans, cabbage, have store of small roots, all issuing from the seed, like the undermost set of culmiferous roots; and they have no other roots. A potato and a turnip have bulbous roots. Red clover has a strong tap-root. The difference between culmiferous and leguminous plants with respect to the effects they produce in the soil, will be insisted on afterward, in the section concerning rotation of crops. As the present section is confined to the propagation of plants, it falls naturally to be divided into three articles; first, Plants cultivated for fruit; second, Plants cultivated for roots; third, Plants cultivated for leaves.

I. Plants Cultivated for Fruit.

I. WHEAT and RYE.

²¹⁶ Fallowing for wheat. Any time from the middle of April to the middle of May, the fallowing for wheat may commence. The moment should be chosen, when the ground, beginning to dry, has yet some remaining softness: in that condition, the soil divides easily by the plough, and falls into small parts. This is an essential article, deserving the strictest attention of the farmer. Ground ploughed too wet, rises, as we say, *whole-fur*, as when pasture-ground is ploughed: where ploughed too dry, it rises in great lumps, which are not reduced by subsequent ploughings; not to mention, that it requires double force to plough ground too dry, and that the plough is often broken to pieces. When the ground is in proper order, the farmer can have no excuse for delaying a single minute. This first course of fallow must, it is true, yield to the barley-feed; but as the barley-feed is commonly over the first week of May, or sooner, the season must be unfavourable if the fallow cannot be reached by the middle of May.

As clay soil requires high ridges, these ought to be cleaved at the first ploughing, beginning at the furrow, and ending at the crown. This ploughing ought to be as deep as the soil will admit: and water-furrowing ought instantly to follow; for if rain happen before water-furrowing, it stagnates in the furrow, necessarily delays the second ploughing till that part of the ridge be dry, and prevents the furrow from being mellowed and roasted by the sun. If this first ploughing be well executed, annual weeds will rise in plenty.

About the first week of June, the great brake will loosen, and reduce the soil, encourage a second crop of

annuals, and raise to the surface the roots of weeds moved by the plough. Give the weeds time to spring, which may be in two or three weeks. Then proceed to the second ploughing about the beginning of July; which must be cross the ridges, in order to reach all the slips of the former ploughing. By cross-ploughing the furrows will be filled up, and water-furrowing be still more necessary than before. Employ the brake again about the 10th of August, to destroy the annuals that have sprung since the last stirring. The destruction of weeds is a capital article in following: yet fo blind are people to their interest, that nothing is more common than a fallow field covered with charlock and wild mustard, all in flower, and 10 or 12 inches high. The field having now received two harrowings and two brakings is prepared for manure, whether lime or dung, which without delay ought to be incorporated with the soil by a repeated harrowing and a gathering furrow. This ought to be about the beginning of September, and as soon after as you please the seed may be sown.

As in ploughing a clay soil it is of importance to prevent poaching, the hinting furrows ought to be done with two horses in a line. If four ploughs be employed in the same field, to one of them may be allotted the care of finishing the hinting furrows.

Loam, being a medium between sand and clay, is ²¹⁷ Dresting of all soils the fittest for culture, and the least subject to chances. It does not hold water like clay; and ²¹⁷ when wet, it dries sooner. At the same time, it is more retentive than sand of that degree of moisture which promotes vegetation. On the other hand, it is more subject to couch-grass than clay, and to other weeds; to destroy which, fallowing is still more necessary than in clay.

Beginning the fallow about the first of May, or as soon as barley seed is over, take as deep a furrow as the soil will admit. Where the ridges are so low and narrow as that the crown and furrow can be changed alternately, there is little or no occasion for water-furrowing. Where the ridges are so high as to make it proper to cleave them, water-furrowing is proper: The second ploughing may be at the distance of five weeks. Two crops of annuals may be got in the interim, the first by the brake and the next by the harrow; and by the same means eight crops may be got in the season. The ground must be cleared of couch grass and knot grass roots, by the cleaning harrow described above. The time for this operation is immediately before the manure is laid on. The ground at that time being in its loosest state, parts with its grass roots more freely than at any other time. After the manure is spread, and incorporated with the soil by braking or harrowing, the seed may be sown under furrow, if the ground hang so as easily to carry off the moisture. To leave it rough without harrowing has two advantages: it is not apt to cake with moisture, and the inequalities make a sort of shelter to the young plants against frost. But if it lie flat, it ought to be smoothed with a slight harrow after the seed is sown, which will facilitate the course of the rain from the crown to the furrow.

A sandy soil is too loose for wheat. The only chance ²¹⁸ Drilling a sandy soil. for a crop is after red clover, the roots of which bind the soil; and the instructions above given for loam are applicable

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Time for sowing.

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Setting of wheat,

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a capital improvement in agriculture.

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Method.

applicable here. Rye is a crop much fitter for sandy soil than wheat; and like wheat, it is generally sown after a summer fallow.

Lastly, Sow wheat as soon in the month of October as the ground is ready. When sown a month more early, it is too forward in the spring and apt to be hurt by frost: when sown a month later, it has not time to root before frost comes on; and frost spews it out of the ground.

Setting of wheat, a method which by some is reckoned one of the greatest improvements in husbandry that has taken place this century. It seems to have been first suggested by planting grains in a garden from mere curiosity, by persons who had no thought or opportunity of extending it to a lucrative purpose. Nor was it attempted on a larger scale, till a little farmer near Norwich began it, about 25 years since, upon less than an acre of land. For two or three years only a few followed his example; and these were generally the butt of their neighbours merriment for adopting so singular a practice. They had, however, considerably better corn and larger crops than their neighbours: this, together with the saving in seed, engaged more to follow them: while some ingenious persons, observing its great advantage, recommended and published its utility in the Norfolk papers. These recommendations had their effect. The curiosity and inquiry of the Norfolk farmers (particularly round Norwich) were excited, and they found sufficient reason to make general experiments. Among the rest was one of the largest occupiers of lands in that county, who set 57 acres in one year. His success, from the visible superiority of his crop, both in quantity and quality, was so great, that the following autumn he set 300 acres, and has continued the practice ever since. This noble experiment established the practice, and was the means of introducing it generally among the intelligent farmers in a very large district of land; there being few who now sow any wheat, if they can procure hands to set it. It has been generally observed, that although the set crops appear very thin during the autumn and winter, the plants side-shoot and spread prodigiously in the spring. The ears are indisputably larger, without any dwarfish or small corn; the grain is of a larger bulk, and specifically heavier *per bushel* than when sown.

The lands on which this method is particularly prosperous, are either after a clover stubble, or on which trefoil and grass seed were sown the spring before the last. These grounds, after the usual manuring, are once turned over by the plough in an extended flag or turf, at ten inches wide; along which a man, who is called a *dibbler*, with two setting irons, somewhat bigger than ramrods, but considerably bigger at the lower end, and pointed at the extremity, steps backwards along the turf, and makes the holes about four inches asunder every way, and an inch deep. Into these holes the droppers (women, boys, and girls) drop two grains, which is quite sufficient. After this, a gate bushed with thorns is drawn by one horse over the land, and closes up the holes. By this mode, three pecks of grain is sufficient for an acre; and being immediately buried, it is equally removed from vermin or the power of frost. The regularity of its rising gives the best

opportunity of keeping it clear from weeds, by weeding or hand-hoeing.

Wheat-setting is a method peculiarly beneficial when corn is dear; and, if the season be favourable, may be practised with great benefit to the farmer. Sir Thomas Beevor of Hethel-Hall in Norfolk, found the produce to be two bushels *per acre* more than from the wheat which is sown; but having much less small corn intermixed with it, the sample is better, and always fetches a higher price, to the amount generally of two shillings *per quarter*.

This method, too, saves to the farmer and to the public six pecks of seed wheat in every acre; which, if nationally adopted, would of itself afford bread for more than half a million of people.

Add to these considerations, the great support given to the poor by this *second* harvest, as it may be called, which enables them to discharge their rents and maintain their families without having recourse to the parish.—The expence of setting by hand is now reduced to about six shillings *per acre*; which, in good weather, may be done by one dibbler, attended by three droppers, in two days. This is five shillings *per day*; of which if the dibbler gives to the children sixpence each, he will have himself three shillings and sixpence for his day's work, which is much more than he can possibly earn by any other labour so easy to himself. But put the case, that the man has a wife who dibbles with him, and two or three of his own children to drop to him, you see his gains will then be prodigious, and enough to ensure a plenty of candidates for that work, even in the least populous parts of the country.

It is, however, to be observed with regard to this method, that in seasons when seed-corn is very cheap, or the autumn particularly unfavourable to the practice, it must certainly be lessened. In light lands, for instance, a very dry time prevents dibbling; as the holes made with the instruments will be filled up again by the mould as fast as the instrument is withdrawn. So, again, in a very wet season, on strong and stiff clays, the seeds in the holes cannot be well and properly covered by the bushes drawn over them. But these extremes of dry and wet do not often happen, nor do they affect lands of a moderately consistent texture, or both light and heavy soils at the same time; so that the general practice is in fact never greatly impeded by them.

Propagating of wheat by dividing and transplanting its roots. In the Philosophical Transactions for 1768, we meet with a very important experiment, of which the following is an abstract. On the 2d of June 1766, Mr C. Miller sowed some grains of the common red wheat; and on the 8th of August a single plant was taken up and separated into 18 parts, and each part planted separately. These plants having pushed out several side-shoots, by about the middle of September; some of them were then taken up and divided, and the rest of them between that time and the middle of October. This second division produced 67 plants. These plants remained through the winter, and another division of them, made between the middle of March and the 12th of April, produced 500 plants. They were then divided no further, but permitted to remain. The plants were in general stronger than any of the wheat in the fields. Some of them produced upwards

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Culture of particular Plants. of 100 ears from a single root. Many of the ears measured seven inches in length, and contained between 60 and 70 grains.

The whole number of ears which, by the process above mentioned, were produced from one grain of wheat, was 21,109, which yielded three pecks and three quarters of clean corn, the weight of which was 47lb. 7 ounces; and from a calculation made by counting the number of grains in an ounce, the whole number of grains was about 576,840.

By this account we find, that there was only one general division of the plants made in the spring. Had a second been made, Mr Miller thinks the number of plants would have amounted to 2000 instead of 500, and the produce thereby been much enlarged.

The ground was a light blackish soil, upon a gravelly bottom; and, consequently, a bad soil for wheat. One half of the ground was well dunged, the other half had no manure. There was, however, not any difference discoverable in the vigour, or growth, or produce, of the plants.

It must be evident, that the expence and labour of setting in the above manner by the hand, will render it scarcely practicable upon a large scale so as to be productive of any utility. A correspondent of the Bath Society, therefore, (Robert Bogle, Esq. of Daldowin, near Glasgow), with a view to extend the practice, has proposed the use of the harrow and roller until some better implements be invented. This method occurred to him from attending to the practice usual with farmers on certain occasions, of harrowing their fields after the grain is sprung up. Upon investigating the principles upon which these practices are founded, he found them confined merely to that of pulverizing the earth, without any attention to Mr Miller's doctrine. They said, "that after very heavy rains, and then excessive dry weather, the surface of their lands was apt to be caked, the tender fibres of the young roots were thereby prevented from pushing, and of course the vegetation was greatly obstructed; in such instances, they found very great benefit from harrowing and rolling."

These principles he acknowledges to be well founded, so far as relates to pulverizing; but contends, that the benefit arising from harrowing and rolling is not derived from pulverizing entirely, but also from subdividing and enabling the plants to tiller (as it is termed). "The harrow (he observes) certainly breaks the incrustation on the surface, and the roller crumbles the clods; but it is also obvious, that the harrow removes a great many of the plants from their original stations; and that if the corn has begun to tiller at the time it is used, the roots will be, in many instances, subdivided, and then the application of my system of divisibility comes into play. The roller then serves to plant the roots which have been torn up by the harrow."

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Objections. But on this the Society observe, that the teeth of a harrow are too large to divide roots so small and tenacious as are those of grain; and whenever such roots (however tillered) stand in the line any tooth makes, they will, if small, be only turned on one side by the earth yielding to their lateral pressure, or, if large, the whole root will probably be drawn out of the ground. The principal uses, therefore, derived from harrowing and rolling these crops are, opening the soil between

the plants, earthing them up, breaking the clods, and closing the earth about their roots.

In a subsequent letter, Mr Bogle, without contesting these points, further urges the scheme of propagating wheat by dividing and transplanting its roots. "I have conversed (says he) much with many practical farmers, who all admit that my plan has the appearance not only of being practical, but advantageous. I have also seen, in the ninth number of Mr Young's Annals of Agriculture, the account of an experiment which strongly corroborates my theory. It was made by the Rev. Mr Pike of Edmonton. From this, and other experiments which have been made under my own eye, I foresee clearly, that the system is practicable, and will certainly be productive of great benefit, should it become general. Besides the saving of nine-tenths of the land sown broad-cast, other very important advantages will attend the setting out of wheat from a seed-bed: such as an early crop; the certainty of good crops; rendering a summer-fallow unnecessary; saving dung; and having your wheat perfectly free from weeds without either hand or horse-hoeing. Five hundred plants in April produced almost a bushel of grain. My gardener says, he can set one thousand plants in a day, which is confirmed by the opinion of two other gardeners. Mr Miller found no difference in the produce of what was planted on lands that had dung, and on what had none, except where the land was improper for wheat at all."

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Practicability of the scheme asserted. On this letter we have the following note by the Bath Society: "Mr Bogle will see, by the society's premium book this year, that by having offered several premiums for experiments of the kind he so earnestly recommends, we wish to have his theory brought to the test of practice. Our reason for this, as well as for printing Mr B's letter, was rather to excite decisive trials by ingenious persons, than from any expectation of the practice ever becoming a general one. General, indeed, it never can be. A sufficient number of hands could not be found to do it. Unkindly seasons at the time of transplanting and dividing the roots would frequently endanger and injure, if not destroy, the crops. But admitting the mode generally practicable, we very much doubt whether all the advantages he has enumerated would be derived from this mode of culture. Why should dividing and transplanting the roots of wheat cause the crop to be early, or afford a certainty of its being a good one? We cannot think that less manure is necessary in this method than either in drilling or broad-cast; nor can we by any means admit, such crops would be perfectly free from weeds without either hand or horse-hoeing." We readily agree with Mr Bogle, that by this mode of culture on a general scale, an immense quantity of seed-corn would be annually saved to the nation; and in this, we believe, the advantage, were it practicable, would principally consist."

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Further observations of Mr Bogle. Upon the same subject, and that of harrowing all kinds of corn, we are informed, Mr Bogle afterwards communicated to the Society his thoughts more at large, together with authentic accounts which were made at his instance, and which were attended with very great success. These must undoubtedly be regarded as of very great importance, and accordingly the society, conceiving his system may be attended

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with considerable advantages if brought into general practice, have given, at the end of their third volume, a few of his leading principles. Mr Bogle states, 1. That he has known many instances of very great crops having been obtained by harrowing fields of corn after they were sprouted; and therefore recommends the practice very warmly.

2. That he has also received an authentic account of one instance where the same good effects were produced by ploughing the field.

3. On the system of transplanting, he states, that a very great proportion of the seed will be saved, as a farmer may have a nursery, or small patch of plants, from which his fields may be supplied; he calculates that one acre will yield plants sufficient for 100 acres.

4. That a very great increase of crops may be obtained by this method, probably a double crop, nay perhaps a triple quantity of what is reaped either by drilling or by the broad-cast husbandry.

5. That a great part of the labour may be performed by infirm men and women, and also by children, who are at present supported by the parish charity; and that of course the poor's rates may be considerably reduced.

6. That the expence will not exceed from 20s. to 30s. per acre, if the work be performed by able bodied men and women; but that it will be much lower, if that proportion of the work which may be done by employing young boys and girls should be allotted to them.

7. That in general he has found the distance of nine inches every way a very proper distance for setting out the plants at; but recommends them to be tried at other spaces, such as 6, 8, or even 12 inches.

8. That he conceives an earlier crop may be obtained in this manner than can be obtained by any other mode of cultivation.

9. That a clean crop may also be procured in this way, because if the land be ploughed immediately before the plants are set out, the corn will spring much quicker from the plants than the weeds will do from their seeds; and the corn will thereby bear down the growth of the weeds.

10. That such lands as are overflowed in the winter and spring, and are of course unfit for sowing with wheat in the autumn, may be rendered fit for crops of wheat by planting them in the spring, or even in the summer.

11. That he has known instances of wheat being transplanted in September, October, November, February, March, April, and even as late as the middle of May, which have all answered very well.

12. That he has known an early kind of wheat sown as late as the middle of May, which has ripened in very good time; and from that circumstance he conceives, if the plants should be taken from that early kind, the season of transplanting might be prolonged at least till the 1st of July, perhaps even later.

13. That he has reason to think wheat, oats, and barley, are not annuals, but are perennials, provided they are eaten down by cattle and sheep, or are kept low by the scythe or sickle; and are prevented from spindling or coming to the ear.

14. That one very prevalent motive with him in prosecuting this plan, is, that he is of opinion it may

enable government to devise means of supporting the vagrant poor, both old and young, who are now to be met with everywhere, both in towns and in the country, and who are at present a burden on the community: but if such employment could be struck out for them, a comfortable subsistence might be provided for them by means of their own labour and industry; and not only save the public and private charitable contributions, but may also render that class of people useful and profitable subjects; instead of their remaining in a useless, wretched, and perhaps a profligate and vicious course of life.

Lastly, Mr Bogle has hinted at a secondary object which he has in view, from this mode of cultivation, which he apprehends may in time, with a small degree of attention, prove extremely advantageous to agriculture.—It is, that, in the first place, the real and intrinsic value of different kinds of grain may be more accurately ascertained by making a comparison of it with a few plants of each kind set out at the same time, than can be done when sown in drills or broad-cast; and when the most valuable kinds of wheat, oats, or barley, are discovered, he states, that in a very short time (not exceeding four or five years) a sufficient quantity of that valuable kind may be procured to supply the kingdom with seed from a single grain of each kind; for he calculates, that 47,000 grains of wheat may be produced by divisibility in two years and three months.

Upon these propositions the Society observes, "That although Mr Bogle appears to be too sanguine in his expectations of seeing his plan realized in *general practice*, it certainly merits the attention of gentlemen farmers. We wish them to make fair experiments, and report their success. Every grand improvement has been, and ever will be, progressive. They must necessarily originate with gentlemen; and thence the circle is extended by almost imperceptible degrees over provinces and countries. At all events, Mr Bogle is justly entitled to the thanks of the Society, and of the public, for the great attention he has paid to the subject."

There is perhaps no part of Great Britain where this species of grain is cultivated to more perfection than in Norfolk. Mr Marshal informs us, that the species raised in that county is called the *Norfolk red*, and weighs heavier than any other which has yet been introduced, though he owns that its appearance is much against the assertion, it being a long thin grain, resembling rye more than well bodied wheat. About 15 or 20 years ago a new species was introduced, named the *Kentish cosh*; against which the millers were at first very much prejudiced, though this prejudice is now got over. A remarkable circumstance respecting this grain is, that though upon its introduction into the county the *cosh* or husk be perfectly white, yet such is the power either of the soil or of the mode of cultivation to produce what the botanists call *varieties*, that the grain in question is said to lose every year somewhat of the whiteness of its husks, until they become at last equally red with those of the former kind. The southern and south-eastern parts of the county generally enjoy a stronger and richer soil than the more northerly, and therefore are more proper for the cultivation of that species of grain. In the northern parts are some farms of very light soil, where the farmers sow

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only a small quantity of wheat; and these light lands are called *barley farms*.

The greatest part of the wheat in Norfolk is sown upon a second year's ley; sometimes it is sown upon a first year's ley; sometimes on a summer fallow; after peas, turnips, or buck harvested or ploughed under. The practice adopted by those who are looked upon as superior husbandmen in the county of Norfolk is as follows: The second year's leys having finished the bullocks, and brought the stock cattle and horses through the fore part of summer, and the first year's leys having been made ready to receive his stock, the farmer begins to break up his old land or ley ground by a peculiar mode of cultivation named *rice-balking*, in which the furrow is always turned toward the unploughed ground, the edge of the coulter passing always close by the edge of the flag last turned. This is done at first with an even regular furrow; opportunity being taken for performing the operation after the surface has been moistened by a summer shower. In this state his summer leys remain until towards the end of harvest, when he harrows and afterwards ploughs them across the balks of the former ploughing, bringing them now up to the full depth of the soil. On this ploughing he immediately harrows the manure, and ploughs it in with a shallow furrow. The effects of this third ploughing are to mix and effectually pulverize the soil and manure; to cut off and pulverize the upper surfaces of the furrows of the second ploughing; and thus, in the most effectual manner, to eradicate or smother the weeds which had escaped the two former ones. Thus it lies until the seed time, when it is harrowed, rolled, sown, and gathered up into ridges of such width as the farmer thinks most proper. Those of six furrows are most common, though some very good farmers lay their wheat land into four furrow, and others into ten furrow ridges; "which last (says our author) they execute in a style much superior to what might be expected from wheel ploughs." They excel, however, in the six-furrow ploughing; of which Mr Marshall gives a particular account. When ploughing in this manner, they carry very narrow furrows; so that a six-furrow ridge, set out by letting the off-horse return in the first-made furrow, does not measure more than three feet eight or nine inches.

When wheat is cultivated after the first year's lay, the seed is generally sown upon the flag or furrow turned over. After pease, one or two ploughings are given; the other parts of the management being the same with that after the second year's ley already mentioned. After buck harvested he seldom gives more than two, and sometimes but one, ploughing. In the former case he spreads his manure on the stubble, and ploughs it in with a shallow furrow; harrows, rolls, sows, and gathers up the soil into narrow work. The manure is in like manner spread on the stubble after once ploughing, and the seed is then sown among the manure; the whole ploughed in together, and the soil gathered up into narrow ridges, as if it had undergone the operations of a fallow. An inconvenience attending this practice is, that the buck which is necessarily shed in harvesting springs up among the wheat, and becomes a weed to it, at the same time that the rooks, if numerous, pull up both buck and wheat, leaving several patches quite bare. This is obviated in a great

measure by first ploughing in the manure and self-sown buck with a shallow furrow; in consequence of which the buck vegetates before the wheat.

It is likewise a favourite practice with the Norfolk farmers to raise wheat after buck ploughed under. They plough under the buck by means of a broom made of rough bushes fixed to the fore tackle of the plough between the wheels, which bears down the plant without lifting the wheels from the ground. Sometimes, when the buck is strong, they first break it down with a roller going the same way that the plough is intended to go; afterwards a good ploughman will cover it so effectually that scarce a stalk can be seen. Sometimes the surface of the ground is left rough, but it is more eligible to harrow and roll it. The practice of summer fallowing seldom occurs in Norfolk; though sometimes, when the soil has been much worn down by cropping, and overrun by weeds, it is esteemed a judicious practice by many excellent husbandmen, and the practice seems to be daily gaining ground. After turnips the soil is ploughed to a moderate depth, and the seed sown over the first ploughing: but if the turnips be got in early, the weeds are sometimes first ploughed in with a shallow furrow, and the seed ploughed under with a second ploughing, gathering the soil into narrow ridges.

With regard to the manuring of the ground for wheat in Norfolk, that which has been recently clayed or marled is supposed to need no other preparation any more than that which has received 15 or 20 loads of dung and mould for turnips; the first year's ley having been teathed in autumn, and the second fed off. Where the soil is good, and the wheat apt to run too much to straw, it is the practice of some judicious farmers to set their manure upon the young clover, thereby depriving the wheat in some degree of its rankness; but it is most common to spread it upon the broken ground; or if the seed be sown upon the turned furrow, to spread it on the turf and plough it under; or to spread it on the ploughed surface, and harrow it in with the seed as a top-dressing. A smaller quantity of manure is generally made use of for wheat than for turnips. From eight to ten cart loads (as much as three horses can conveniently draw) are reckoned sufficient for an acre; three or four chaldrons of lime to one acre, or 40 bushels of foot to the same quantity of ground; or about a ton of rape-cake to three acres.

In this county they never begin to sow wheat till after the 17th of October, and continue till the beginning of December, sometimes even till Christmas. They give as a reason for this late sowing, that the wheat treated in this manner is less apt to run to straw than when sown earlier. The seed is generally prepared with brine, and candied in the usual manner with lime. The following method of preparing it is said to be effectual in preventing the smut. "The salt is dissolved in a very small quantity of water, barely sufficient for the purpose. The lime is slaked with this solution, and the wheat candied with it in its hottest state, having been previously moistened with pure water." According to our author's observation, the crops of those farmers who use this preparation are in general more free from smut than those who make use of any other.

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237 Method of sowing.

238 Ploughing the seed under furrow described.

239 Instruments for dibbling wheat described.

The practice of dibbling or setting of wheat has not as yet become general throughout Norfolk, the common broad-cast method being usually followed, except on the Suffolk side of the county. Some few make use of dibbling and sluting rollers; but drilling is almost entirely unknown, notwithstanding the great aptitude of soil for the practice. Ploughing in the seed under furrow is the favourite mode of the Norfolk farmers, and is performed in the following manner: "The land having been harrowed down level, and the surface rendered smooth by the roller, the head ploughman (if at leisure) marks out the whole piece in narrow slips of about a statute rood in width. This he does by hanging up the plough in such a manner, that no part of it except the heel touches the ground; and this makes a sure mark for the seedsmen, which he cannot by any means mistake. In case the ploughs are all employed, the seedsmen himself marks the ground, by drawing a piece of wood or other heavy body behind him." Mr Marshall prefers this to the Kentish method of setting up sticks in the form of a lane, as being less liable to produce mistakes.

In those places where wheat is dibbled, they make use of iron instruments for the purpose. The acting part is an egg-shaped knob, somewhat larger than a pigeon's egg; the smaller end is the point of the dibble, the larger having a rod of iron rising from it about half an inch square, and two feet and an half long; the head being received into a cross piece of wood resembling the crutch of a spade or shovel, which forms the handle. The dibbler uses two of these instruments, one in each hand; and, bending over them, walks backward upon the turned furrows, making two rows of holes in each of them. Those rows are usually made at the distance of four inches from each other; the holes being two and a half or three inches distant, viz. four in each length of the foot of the dibbler. The great art in making these lies in leaving them firm and smooth in the sides, so that the loose mould may not run in to fill them up before the seeds are deposited. This is done by a circular motion of the hand and wrist; making a semi-revolution every stroke; the circular motion beginning as the bit enters, and continuing until it is entirely disengaged from the mould. The operation is not perfect unless the dibles come out clean and wear bright. It is somewhat difficult to make the holes at equal distances; but more especially to keep the two straight and parallel to each other, some practice being required to guide the instruments in such a manner as to correspond exactly with each other; but though couples have been invented to remedy this inconvenience to keep them at a proper distance, the other method is still found to be preferable. A middling workman will make four holes in a second. One dibbler is sufficient for three droppers; whence one man and three children are called a *set*. The dibbler carries on three flags or turned furrows; going on some yards upon one of the outside furrows, and returning upon the other, after which he takes the middle one; and thus keeps his three dibles constantly employed, and at the same time is in no danger of filling up the holes with his feet. The droppers put in two or three grains of wheat into each hole; but much time and patience is necessary to teach them to perform the business properly and quickly. An expert dibbler will

hole half an acre in a day; though one third of an acre is usually reckoned a good day's work. The seed is covered by means of a bush harrow; and from one bushel to six pecks is the usual quantity for an acre. Notwithstanding the advantages of sowing seed, as well as some others which are generally reckoned undeniable, it is here asserted by some very judicious farmers, that dibbling of wheat on the whole is not really a profitable practice. It is particularly said to be productive of weeds unless dibbled very thick: which indeed may probably be the case, as the weeds are thus allowed a greater space to vegetate in. Mr Marshall himself is of opinion, that "the dibbling of wheat appears to be peculiarly adapted to rich deep soils, on which three or four pecks dibbled early may spread sufficiently for a full crop; whereas light, weak, shallow soils, which have lain two or three years, and have become grassy, require an additional quantity of seed, and consequently an addition of labour, otherwise the plants are not able to reach each other, and the grasses of course find their way up between them, by which means the crop is injured and the soil rendered foul."

The same author has likewise given an account of the method of cultivating wheat practised in other English counties. In the midland district, including part of Staffordshire, Derbyshire, Warwick, and Leicestershire, we are informed that the species usually sown is that called *Red Lanmas*, the ordinary red wheat of the kingdom: but of late a species named the *Essex dun*, similar to the *Kentish white cob* of Norfolk, and the *Hertfordshire brown* of Yorkshire, has been coming into vogue. Cone-wheat, formerly in use in this district, is now out of fashion. Spring wheat is cultivated with remarkable success, owing principally to the time of sowing; viz. the close of April. Our author was informed by an excellent farmer in these parts, that by sowing early, as in the beginning of March, the grain was liable to be shrivelled, and the straw to be blighted; while that which was sown towards the end of April, or even in the beginning of May, produced clean plump corn. At the time he visited this county, however, it seemed to be falling into disrepute; though he looks upon it, in some situations, especially in a turnip country, to be eligible. In the ordinary succession in this part of the kingdom, wheat comes after oats; and there is perhaps nine-tenths of the wheat in this district sown upon oat-stubble. Our author has also seen a few examples of wheat being sown upon turf of six or seven years leying; and several others on clover ley once plowed, as well as some after turnips. The best crops, however, produced in this, or perhaps in any other district, are after summer fallow. The time of sowing is the month of October, little being sown before Michaelmas; and in a favourable season, little after the close of the month. Much seed is sown here without preparation. When any is made use of, it is the common one of brine candied with lime. The produce is very great, the medium being full three quarters *per acre*, sometimes four or five; and one farmer, in the year 1784, had on 50 acres of land together, no less than 45 bushels *per acre*.

In the Vale of Gloucester, the *cone-wheat*, a variety of the *triticum turgidum*, is cultivated, as well as the *lanmas*.

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240 Objections against the practice of dibbling.

241 Culture of wheat in the midland district.

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mas and spring wheats. It is not, however, the true cone wheat which is cultivated here, the ears being nearly cylindrical; but our author met with the true species in North-Wiltshire. Beans in this country are the common predecessors of wheat, and sometimes peas; but here the farmers cultivate wheat upon every species of soil. The time of sowing is in November and December, and the seed is thought to be sown in sufficient time if it is done before Christmas. In this country it is thought that late sown crops always produce better than those which are sown early; but Mr Marshall accounts for this by the vast quantity of weeds the latter have to encounter, and which the late sown crops escape by reason of the weakness of vegetation at that time of the year. The produce, however, throughout the Vale of Gloucester, is but very indifferent.—Setting of wheat is not practised, but hoeing universally.—In harvesting, Mr Marshall observes, that the grain is allowed to stand until it be unreasonably ripe, and that it is bound up into very small sheaves. The practice of making double bands is unknown in this district; so that the sheaves are no bigger than can be contained in the length of single straw. The inconveniences of this method are, that the crop requires more time to stook, load and unload, and stack: the advantages are, that the trouble of making bands is avoided; and that if rainy weather happens to intervene, the small sheaves dry much sooner than the large ones. Here the crop is cut very high, the stubble and weeds being mown off in swathes for litter soon after the crop is cut; and sometimes sold as high as 5s. per acre.—Mr Marshall is at a loss to account for the little quantity produced in this country: it being hardly possible to derive it from the nature of the soil, almost all of it being proper for the cultivation of the grain.

Among the Cotswold hills of Gloucester the lammas and cone wheats are sown; and a new variety of the latter was raised not long ago by picking out a single grain of seed from among a parcel. The body is very long and large, but not slightly.—The Cotswold hills are almost proverbial for early sowing of wheat. The general rule is to begin ploughing in July, and sowing the first wet weather in August; so that here the seed-time and harvest of wheat coincide. If, in consequence of this early sowing the blade becomes rank in autumn, it is supposed to be proper to eat it down by putting a large flock of sheep upon it at once. Eating it in spring is considered as pernicious. It is usually weeded with spud-hooks; not hoed, as in the

Vale. One instance, however, is mentioned by our author, in which a very thin crop full of seed-weeds hoed in autumn with uncommon success, occurred in the practice of a superior manager in this district; as well as others in which wheat has been weeded in autumn with great advantage. He also met with another well authenticated instance of the good effect of cutting mildewed wheat while very green. "A fine piece of wheat being lodged by heavy rains, and being soon after perceived to be infected with the mildew, was cut, though still in a perfectly green state; namely, about three weeks before the usual time of cutting. It lay spread abroad upon the stubble until it became dry enough to prevent its caking in the sheaf; when it was bound and set up in sheaves. The result of this treatment was, that the grain, though small,

was of a fine colour, and the heaviest wheat which grew upon the same farm that season; owing, no doubt, to the thinness of its skin. What appears much more remarkable, the straw was perfectly bright, not a speck upon it.—In this part of the country, the produce of wheat is superior to that in the Vale; but Mr Marshall is of opinion, that the soil is much more fit for barley than wheat.

In Yorkshire, though generally a grass land country, and where of consequence corn is only a second-dary concern, yet several kinds of wheat are cultivated, particularly *Zealand*, *Downy Kent*, *Common White*, *Hertfordshire Brown*, *Yellow Kent*, *Common Red*. All these are varieties of winter wheat; besides which they cultivate also the *spring* or *summer wheat*. Here our author makes several curious observations concerning the raising of varieties of plants. "It is

probable, says he, that time has the same effect upon the varieties of wheat and other grains as it has on those of cultivated fruits, potatoes, and other vegetable productions. Thus to produce an early pea, the gardener marks the plants which open first into blossom among the most early kind he has in cultivation. Next year he sows the produce of those plants, and goes over the coming crop in the manner he had done the preceding year, marking the earlier of this early kind. In a similar manner new varieties of apples are raised, by choosing the broadest leaved plants among a bed of seedlings rising promiscuously from pippins. Husbandmen, it is probable, have heretofore been equally industrious in producing fresh varieties of corn; or whence the endless variety of winter wheats? If they be naturally of one species, as Linnaeus has deemed them, they must have been produced by climate, soil, or industry; for although nature sports with individuals, the industry of man is requisite to raise, establish, and continue a permanent variety. The only instance in which I have had an opportunity of tracing the variety down to the parent individual, has occurred to me in this district. A man of acute observation, having, in a piece of wheat, perceived a plant of uncommon strength and luxuriance, diffusing its branches on every side, and setting its closely-surrounding neighbours at defiance; marked it; and at harvest removed it separately. The produce was 15 ears, yielding 604 grains of a strong-bodied liver-coloured wheat, different, in general appearance, from every other variety he had seen. The chaff was smooth, without awns, and of the colour of the grain; the straw stout and reedy. These 604 grains were planted singly, nine inches asunder, filling about 40 square yards of ground, on a clover stubble, the remainder of the ground being sown with wheat in the ordinary way; by which means extraordinary trouble and destruction by birds were avoided. The produce was two gallons and a half, weighing 20½ lb. of prime grain for feed, besides some pounds of seed. One grain produced 35 ears, yielding 1235 grains; so that the second year's produce was sufficient to plant an acre of ground. What deters farmers from improvements of this nature is probably the mischievousness of birds: from which at harvest it is scarcely possible to preserve a small patch of corn, especially in a garden or other ground situated near a habitation; but by carrying on the improvement in a field of corn of the same nature, that inconvenience is

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ably small
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swold hills.

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got rid of. In this situation, however, the botanist will be apprehensive of danger from the floral farina of the surrounding crop. But from what observations I have made, I am of opinion his fears will be groundless. No evil of this kind occurred, though the cultivation of the above variety was carried on among *white* wheat. But this need not be brought as an evidence: it is not uncommon here to sow a mixture of red and white wheats together; and this, it is confidently asserted, without impairing even the colour of either of them. The same mode of culture is applicable to the improvement of varieties; which perhaps would be more profitable to the husbandman than raising new ones, and more expeditious."

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Preparation
of wheat
with arse-
nic.

In Yorkshire the very singular preparation of feed wheat prevails which we formerly mentioned, viz. the steeping it in a solution of *arsenic*, as a preventive of smut. Marshall was informed by one farmer, that he had made use of this preparation for 20 years with success, having never during that long space of time suffered any sensible injury from smut. Our author seems inclined to believe the efficacy of this preparation; but thinks there may be some reason to apprehend danger in the use of such a pernicious mineral, either through the carelessness of servants, or handling of the feed by the person who sows it. The farmer above mentioned, however, during all the time he used it, never experienced any inconvenience either to himself, the feedman, or even to the poultry; though these last, we should have thought, would have been peculiarly liable to accidents from arsenicated feed. The preparation is made by pounding the arsenic extremely fine, boiling it in water, and drenching the feed with the decoction. "In strictness, says Mr Marshall, the arsenic should be levigated sufficiently fine, to be taken up and washed over with water, reducing the sediment until it be fine enough to be carried over in the same manner. The usual method of preparing the liquor is to boil one ounce of white arsenic, finely powdered, in a gallon of water, from one to two hours; and to add to the decoction as much water or stale urine as will increase the liquor to two gallons. In this liquor the seed is, or ought to be, immersed, stirring it about in such a manner as to saturate effectually the downy end of each grain. This done, and the liquor drawn off, the seed is considered as fit for the seed basket, without being candied with lime, or any other preparation. A bushel of wheat has been observed to take up about a gallon of liquor. The price of arsenic is about 6d. per pound; which, on this calculation, will cure four quarters of feed. If no more than three quarters be prepared with it, the cost will be only a farthing per bushel; but to this must be added the labour of pounding and boiling. Nevertheless, it is by much the cheapest, and perhaps, upon the whole, adds Mr Marshall, the best preparation we are at present acquainted with. In this county it is believed, that a mixture of wheat and rye, formerly a very common crop in these parts, is never affected with mildew; but our author does not vouch for the truth of this assertion.

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Wheat and
turnips
sown toge-
ther.

We must not here omit to take notice of a new mode of cultivating wheat contrived by Mr E. Walker of Harpley, Norfolk; which mode of culture we shall also afterwards have occasion to notice when we come to

treat of the culture of turnips. Mr Walker thus explains his mode of procedure in a letter addressed to the publisher of the *Annals of Agriculture*. "I sow in broad-cast, after the turnips have been once hoed, two bushels of wheat or two bushels of rye *per acre*; and then hoe the same in with the second hoeing: if it be hoed by the day it may be best, as it will be better done by the short strokes or cuts with the hoes than otherwise. It is recommended to be done soon after the first hoeing, for many reasons: It becomes a fine herbage, and keeps the land very clean, without any injury to the turnips, or to the wheat or rye. I began to feed in last September, the turnips, &c. the first of the month, and shall continue till all are done. I have fed off with all sorts of stock mixed, and have drawn out the turnips in lines to set the hurdles, as is usual, and fed off the turnips and growing corn in wet and dry weather; but find that dry weather, and sheep, is the properest time and stock; and that sheep and light beasts are the best for light lands, which, on the whole, this method will greatly improve.

"All my experiments have been made without mucking, or any manure, for the turnip and wheat crop; and on those parts where I have fed off at the time it has been dry weather, though with all sorts of stock mixed, and drawing as above, I have grown at the rate of five coomb of wheat *per acre*, and at the rate of eight coomb of rye *per acre*; and some was almost totally destroyed by feeding off in wet weather, as I was determined not to desist, that I might know the bad or good effects from feeding off the turnips with the corn in different weather, as well as the different months; all which I shall be able to give information of next year, to those who wish to know. I find the feed nearly worth the cost of the feed corn, which is a material consideration in case you plough the land for barley or other summer corn; but if the wheat or rye stands a crop to your mind, it will do better to harrow it in the spring, at which time you may sow your grass seeds, which I find answer very well; or plough the stubble early in the autumn, and sow with clover or other seeds."

The well-known author of the *Annals of Agriculture* has given a farther account of this method of cultivation. The idea which led to Mr Walker's experiments was this: Wheat requires a certain degree of stiffness and compactness in the soil upon which it is reared. Of this compactness, sandy soils are apt to be deficient in proportion to the degree of tillage they receive. Hence it occurred to Mr Walker, that if wheat could be sown without any ploughing at all, there would be a better chance of a crop upon certain soils, than after the most expensive system of tillage. Accordingly, in 1784, he executed his scheme on six acres of turnips, which were fed during the succeeding winter by bullocks and sheep, like the rest of his turnip fields, without making the least distinction on account of the wheat that had been sown and was growing among them. It is known, that turnip-land, when fed off, is left highly manured and much trodden; and the question was, whether the first of these circumstances would not counterbalance the last? and, whether even the treading itself might not prove advantageous. The success justified the project, and, in 1785, Mr Walker extended it to 35 acres, a part of which was sown with rye.

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rye. The management was the same as before; the wheat did better than the rye, and the best crop was where the turnips were eaten in the driest weather. In 1786, the same culture was extended to 70, and in 1797 to 100 acres, with complete success; but the crop was not better than that raised in the common way, though in general as good. The effect of this mode of culture, or the profit arising from it, consisted chiefly in this, that upon a farm of 600 acres, the labour of five horses was saved, and at the time of the barley-sowing, when all his neighbours were in the greatest hurry, he was at his ease quietly stirring his turnip fallows. The chief difficulty attending this mode of cultivating wheat arose from the wetness of the season at the time of feeding, as the ground was apt to be too much trodden and poached, particularly when the crop of turnips was very large so as to keep the cattle long upon them. On the contrary, in dry or frosty weather nothing of this kind happened. The greater the crop of turnips, and the more treading that occurred, the crop of wheat seemed afterwards to prosper the better. In a wet season, however, the evil arising from the treading was diminished when sheep alone without bullocks were introduced to consume the turnips. Under this husbandry, the following rotation was used: Two years grass put in among the wheat-stubble, ploughed once, and harrowed both in autumn and spring with the whole dung of the farm; Third year, oats; Fourth, turnips; Fifth, wheat.

2. OATS.

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Effect of
frost upon
tilled land,

As winter-ploughing enters into the culture of oats, we must remind the reader of the effect of frost upon tilled land. Providence has neglected no region intended for the habitation of man. If in warm climates the soil be meliorated by the sun, it is no less meliorated by frost in cold climates. Frost acts upon water, by expanding it into a larger space. Frost has no effect upon dry earth; witness sand, upon which it makes no impression. But upon wet earth it acts most vigorously; it expands the moisture, which requiring more space puts every particle of the earth out of its place, and separates them from each other. In that view, frost may be considered as a plough superior to any that is made, or can be made, by the hand of man: its action reaches the minutest particles; and, by dividing and separating them, it renders the soil loose and friable. This operation is the most remarkable in tilled land, which gives free access to frost. With respect to clay soil in particular, there is no rule in husbandry more essential than to open it before winter in hopes of frost. It is even advisable in a clay soil to leave the stubble rank; which, when ploughed in before winter, keeps the clay loose, and admits the frost into every cranny.

To apply this doctrine, it is dangerous to plough clay soil when wet; because water is a cement for clay, and binds it so as to render it unfit for vegetation. It is, however, less dangerous to plough wet clay before winter than after. A succeeding frost corrects the bad effects of such ploughing; a succeeding drought increases them.

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oats.

The common method is, to sow oats on new-ploughed land in the month of March, as soon as the ground is tolerably dry. If it continues wet all the month of

March, it is too late to venture them after. It is much better to summer-fallow, and to sow wheat in the autumn. But the preferable method, especially in clay soil, is to turn over the field after harvest, and to lay it open to the influences of frost and air, which lessen the tenacity of clay, and reduce it to a free mould. The surface-soil by this means is finely mellowed for reception of the seed; and it would be a pity to bury it by a second ploughing before sowing. In general, the bulk of clay soils are rich; and skilful ploughing without dung, will probably give a better crop, than unskilful ploughing with dung.

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Hitherto of natural clays. We must add a word of carse clays which are artificial, whether left by the sea, or swept down from higher grounds by rain. The method commonly used of dressing carse clay for oats, is, not to stir it till the ground be dry in the spring, which seldom happens before the 1st of March, and the seed is sown as soon after as the ground is sufficiently dry for its reception. Frost has a stronger effect on such clays than on natural clay. And if the field be laid open before winter, it is rendered so loose by frost as to be soon drenched in water. The particles at the same time are so small, as that the first drought in spring makes the surface cake or crust. The difficulty of reducing this crust into mould for covering the oat-seed, has led farmers to delay ploughing till the month of March. But we are taught by experience, that this soil ploughed before winter, is sooner dry than when the ploughing is delayed till spring; and as early sowing is a great advantage, the objection of the superficial crusting is easily removed by the first harrow above described, which will produce abundance of mould for covering the seed. The ploughing before winter not only procures early sowing, but has another advantage: the surface-soil that had been mellowed during winter by the sun, frost, and wind, is kept above.

The dressing a loamy soil for oats differs little from dressing a clay soil, except in the following particular, that being less hurt by rain, it requires not high ridges, and therefore ought to be ploughed crown and furrow alternately.

Where there is both clay and loam in a farm, it is obvious, from what is said above, that the ploughing of the clay after harvest ought first to be despatched. If both cannot be overtaken that season, the loam may be delayed till the spring with less hurt.

Next of a gravelly soil; which is the reverse of clay, as it never suffers but from want of moisture. Such a soil ought to have no ridges; but be ploughed circularly from the centre to the circumference, or from the circumference to the centre. It ought to be tilled after harvest: and the first dry weather in spring ought to be laid hold of to sow, harrow, and roll; which will preserve it in sap.

The culture of oats is the simplest of all. That grain is probably a native of Britain: it will grow on the worst soil with very little preparation. For that reason, as already noticed, before turnip was introduced, it was always the first crop upon land broken up from the state of nature.

Upon such land, may it not be a good method, to build upon the crown of every ridge, in the form of a wall, all the surface-earth, one sod above another, as in a fold for sheep? After standing in this form

all

Culture of particular Plants.

253 Norfolk cultivation of oats.

254 Method of ploughing down oats.

255 Wild oats a weed in the Vale of Gloucester.

256 Oats not cultivated in the Vale of Gloucester.

all the summer and winter, let the walls be thrown down, and the ground prepared for oats. This will secure one or two good crops; after which the land may be dunged for a crop of barley and grass-seeds. This method may answer in a farm where manure is scarce.

In Norfolk this kind of grain is much less cultivated than barley; and the only species observed by Mr Marshall is a kind of white oat, which grows quickly, and seems to be of Dutch extraction. Oats are cultivated occasionally on all kinds of soils, but more especially on cold heavy land, or on very light, unproductive, heathy soils. They most frequently succeed wheat, or ley ground barley: "but (says our author there are no established rules respecting any part of the culture of this time-serving crop." The culture of the ground is usually the same with that of barley; the ground generally undergoing a winter fallow of three or four ploughings, though sometimes they are sown after one ploughing. They are more commonly sown above furrow than barley. The seed-time is made subservient to that of barley, being sometimes sooner and sometimes later than barley seed-time: and Mr Marshall observes, that he has sometimes seen them sown in June; it being observable, that oats sown late ripen earlier than barley sown at the same time. The quantity of seed in Norfolk is from four to five bushels per acre; but he does not acquaint us with the produce. He mentions a very singular method of culture sometimes practised in this county, viz. ploughing down the oats after they begin to vegetate, but before they have got above ground; which is attended with great success, even though the ground is turned over with a full furrow. By this method weeds of every kind are destroyed, or at least checked in such a manner as to give the crop an opportunity of getting above them; and the porosity communicated to the soil is excellently well adapted to the infant plants of barley; which probably might frequently receive benefit from this operation.

In the Vale of Gloucester, Mr Marshall observes, that the wild oat is a very troublesome weed, as well as in Yorkshire; and he is of opinion, that it is as truly a native of Great Britain as any other arable weed, and is perhaps the most difficult to be extirpated. It will lie a century in the soil without losing its vegetative quality. Ground which has lain in a state of grass time immemorial, both in Gloucester and Yorkshire, has produced it in abundance on being broken up. It is also endowed with the same seemingly instinctive choice of seasons and state of the soil as other seeds of weeds appear to have. Hence it is excessively difficult to be overcome; for as it ripens before any crop of grain, it sheds its seed on the soil, where the roughness of its coat probably secures it from birds. The only methods of extirpating this plant are fallowing, hoeing, and handweeding, where the last is practicable, after it has shot its panicle.

No oats are cultivated in the Vale of Gloucester; though the wild oat grows everywhere as already said. Mr Marshall is of opinion that it is better adapted to oats than to barley. The reason he assigns for the preference given to the latter is, that in this part of the country the monks were formerly very numerous, who probably preferred ale to oaten cake.—He now, however, recommends a trial of the grain on the strong-

er cold lands in the arca of the Vale, as they seldom can be got sufficiently fine for barley. The fodder from oats he accounts much more valuable than that from barley to a dairy country; and the grain would more than balance in quantity the comparative difference in price.

In the midland district the Poland oat, which was formerly in vogue, has now given place to the Dutch or Friesland kind. It is constantly sown after turf; one ploughing being given in February, March, or April. The seed-time is the latter end of March and beginning of April, from four to seven bushels an acre; the produce is in proportion to the seed, the medium being about six quarters.

In Yorkshire the Friesland oats are likewise preferred to the Poland, as affording more straw, and being thinner skinned than the latter. The Siberian, or Tartarian oat, a species unnoticed by Linnæus, is likewise cultivated in this country: the reed oat is known, but has not yet come into any great estimation. The grain is light, and the straw too ready to be affected by cattle.

Oats are particularly cultivated in the western division of the Vale of Yorkshire; where the soil is chiefly a rich sandy loam, unproductive of wheat. Five or six bushels, or even a quarter of oats, are sometimes sown upon an acre; the produce from seven to ten quarters. In this country they are threshed in the open air, and frequently even upon the bare ground, without even the ceremony of interposing a cloth. The reasons assigned for this seemingly strange practice are, that if pigs and poultry be employed to eat up the grain which escapes the broom, there will be little or no waste. Here the market is always very great for new oats, the manufacturing parts of West Yorkshire using principally oat-bread. The only objection to this practice is the chance of bad weather; but there is always plenty of straw to cover up the threshed corn, and it is found that a little rain upon the straw does not make it less agreeable to cattle.

In an experiment made by Mr. Bartley near Bristol, upon black oats, we are informed that he had the prodigious increase of 98½ Winchester bushels from four on the acre: the land was a deep, mellow, sandy loam. It had carried potatoes the former year, and received one ploughing for a winter fallow. Another ploughing was given it in February, and the seed was sown on the 27th and 28th of the month. The success of the experiment was supposed to be owing partly to the early sowing and partly to a good deep tillage.

3. BARLEY.

This is a culmiferous plant that requires a mellow soil. Upon that account, extraordinary care is requisite where it is to be sown in clay. The land ought to be stirred immediately after the foregoing crop is removed, which lays it open to be mellowed with the frost and air. In that view, a peculiar sort of ploughing has been introduced, termed ribbing; by which the greatest quantity of surface possible is exposed to the air and frost. The obvious objection to this method is, that half of the ridge is left unmoved. And to obviate that objection, the following method is offered, which moves the whole soil, and at the same time exposes the same quantity of surface to the frost and air.

Culture of particular Plants.

257 Cultivation in the Midland district.

258 In Yorkshire.

259 Singular method of threshing.

260 Experiment on black oats.

261 Culture of barley.

262 Ribbing.

Culture of particular Plants.

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263
A better method.

As soon as the former crop is off the field, let the ridges be gathered with as deep a furrow as the soil will admit, beginning at the crown and ending at the furrows. This ploughing loosens the whole soil, giving free access to the air and frost. Soon after, begin a second ploughing in the following manner: Let the field be divided by parallel lines cross the ridges, with intervals of thirty feet or so. Plough once round an interval, beginning at the edges, and turning the earth toward the middle of the interval; which covers a foot or so of the ground formerly ploughed. Within that foot plough another round similar to the former; and, after that, other rounds, till the whole interval be finished, ending at the middle. Instead of beginning at the edges, and ploughing toward the middle, it will have the same effect to begin at the middle, and to plough toward the edges. Plough the other intervals in the same manner. As by this operation the furrows of the ridges will be pretty much filled up, let them be cleared and water-furrowed without delay. By this method, the field will be left waving like a plot in a kitchen garden, ridged up for winter. In this form, the field is kept perfectly dry; for beside the capital furrows that separate the ridges, every ridge has a number of cross furrows that carry the rain instantly to the capital furrows. In hanging grounds retentive of moisture, the parallel lines above mentioned ought not to be perpendicular to the furrows of the ridges, but to be directed a little downward, in order to carry rain water the more hastily to these furrows. If the ground be clean, it may lie in that state winter and spring, till the time of feed-furrowing. If weeds happen to rise, they must be destroyed by ploughing, or braking, or both; for there cannot be worse husbandry, than to put the seed into dirty ground.

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Advantages of this method.

This method resembles common ribbing in appearance, but is very different in reality. As the common ribbing is not preceded by a gathering furrow, the half of the field is left untilled, compact as when the former crop was removed, impervious in a great measure to air or frost. The common ribbing at the same time lodges the rain-water on every ridge, preventing it from descending to the furrows; which is hurtful in all soils, and poisonous in a clay soil. The *stitching* here described, or *ribbing*, if you please to call it so, prevents these noxious effects. By the two ploughings the whole soil is opened, admitting freely air and frost; and the multitude of furrows lays the surface perfectly dry, giving an early opportunity for the barley-feed. — But further, as to the advantage of this method: When it is proper to sow the seed, all is laid flat with the brake, which is an easy operation upon soil that is dry and pulverized; and the feed-furrow which succeeds, is so shallow as to bury little or none of the surface earth: whereas the stirring for barley is commonly done with the deepest furrow; and consequently buries all the surface soil that was mellowed by the frost and air. Nor is this method more expensive; because the common ribbing must always be followed with a stirring furrow, which is saved in the method recommended. Nay, it is less expensive; for after common ribbing, which keeps in the rain-water, the ground is commonly so soured, as to make the stirring a laborious work.

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Management of feed in a dry season.

It is well known that barley is less valuable when it
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does not ripen equally; and that barley which comes up speedily in a dusky soil, must gain a great advantage over feed-weeds. Therefore, first take out about one-third of the contents of the sacks of feed barley or bear, to allow for the swelling of the grain. Lay the sacks with the grain to steep in clean water; let it lie covered with it for at least 24 hours. When the ground is so dry as at present, and no likelihood of rain for 10 days, it is better to lie 36 hours. Sow the grain wet from steeping, without any addition of powdered quicklime, which, though often recommended in print, can only poison the feed, suck up part of its useful moisture, and burn the hands of the sower. The feed will scatter well, as clean water has no tenacity; only the sower must put in a fourth or a third more feed in bulk than usual of dry grain, as the grain is swelled in that proportion: harrow it in as quickly as possible after it is sown; and though not necessary, give it the benefit of fresh-furrow, if convenient. You may expect it up in a fortnight at farthest.

The following experiment by a correspondent of the Bath Society being considered as a very interesting one, is here subjoined.

“The last spring (1783) being remarkably dry, I soaked my feed-barley in the black water taken from a reservoir which constantly receives the draining of my dung heap and stables. As the light corn floated on the top, I skimmed it off, and let the rest stand 24 hours. On taking it from the water, I mixed the feed grain with a sufficient quantity of sifted wood-ashes, to make it spread regularly, and sowed three fields with it. I began sowing the 16th, and finished the 23d of April. The produce was 60 bushels *per acre*, of good clean barley, without any *small* or *green* corn, or weeds, at harvest. No person in this country had better grain.”

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Important experiments on feed-barley.

I sowed also several other fields with the same feed dry, and without any preparation; but the crop, like those of my neighbours, was very poor; not more than twenty bushels *per acre*, and much mixed with *green* corn and weeds when harvested. I also sowed some of the feed dry on one ridge in each of my former fields, but the produce was very poor in comparison of the other parts of the field.”

Where the land is in good order, and free of weeds, Time of April is the month for sowing barley. Every day is proper, from the first to the last.

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sowing.

The dressing loamy soil and light soil for barley, is the same with that described; only that to plough dry is not altogether so essential as in dressing clay soil. Loam or sand may be stirred a little moist: better, however, delay a week or two, than to stir a loam when wet. Clay must never be ploughed moist, even though the season should escape altogether. But this will seldom be necessary; for not in one year of 20 will it happen, but that clay is dry enough for ploughing some time in May. Frost may correct clay ploughed wet after harvest; but when ploughed wet in the spring, it unites into a hard mass, not to be dissolved but by very hard labour.

On the cultivation of this grain we have the following observations by a Norfolk farmer.

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Miscellaneous observations concerning the cultivation of barley.

The best soil, he observes, is that which is dry and healthy, rather light than stiff, but yet of sufficient tenacity and strength to retain the moisture. On this kind

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kind of land the grain is always the best bodied and coloured, the nimblest in the hand, and has the thinnest rind. These are qualities which recommend it most to the maltster. If the land is poor, it should be dry and warm; and when so, it will often bear better corn than richer land in a cold and wet situation.

In the choice of your seed, it is needful to observe, that the best is of a pale lively colour, and brightish cast, without any deep redness or black tinge at the tail. If the rind be a little shrivelled, it is the better; for that slight shrivelling proves it to have a thin skin, and to have sweated in the mow. The necessity of a change of seed by not sowing two years together what grew on the same soil, is not in any part of husbandry more evident than in the culture of this grain, which, if not frequently changed, will grow coarser and coarser every succeeding year.

It has generally been thought, that seed-barley would be benefited by steeping; but liming it has, in many instances, been found prejudicial. Sprinkling a little foot with the water in which it is steeped has been of great service, as it will secure the seed from insects. In a very dry seed time, barley that has been wetted for malting, and begins to sprout, will come up sooner, and produce as good a crop as any other.

If you sow after a fallow, plough three times at least. At the first ploughing, lay your land up in small ridges, and let it remain so during the winter, for the frost to mellow it; the second ploughing should be the beginning of February. In March split the ridges, and lay the land as flat as possible, at the same time harrowing it fine. But in strong wet lands (if you have no other for barley) lay it round, and make deep furrows to receive the water.

"I have often (continues he), taken the following method with success: On lands tolerably manured, I sowed clover with my barley, which I reaped at harvest; and fed the clover all the following winter, and from spring to July, when I fallowed it till the following spring, and then sowed it with barley and clover as before. Repeating this method every year, I had very large crops, but would not recommend this practice on poor light land.

"We sow on our lightest lands in April, on our moist lands in May; finding that those lands which are the most subject to weeds produce the best crops when sown late.

"The common method is to sow the barley-seed broad-cast at two sowings; the first harrowed in once, the second twice; the usual allowance from three to four bushels *per* acre. But if farmers could be prevailed on to alter this practice, they would soon find their account in it. Were only half the quantity sown equally, the produce would be greater, and the corn less liable to lodge: For when corn stands very close, the stalks are drawn up weak; and on that account are less capable of resisting the force of winds, or supporting themselves under heavy rains.

"From our great success in setting and drilling wheat, some of our farmers tried these methods with barley; but did not find it answer their expectations, except on very rich land.

"I have myself had 80 stalks on one root of barley, which all produced good and long ears, and the grain was better than any other; but the method is too ex-

pensive for general practice. In poor land, sow thin, or your crop will be worth little. Farmers who do not reason on the matter will be of a different opinion; but the fact is indisputable."

When the barley is sowed and harrowed in, he advises that the land be rolled after the first shower of rain, to break the clods. This will close the earth about the roots, which will be a great advantage to it in dry weather.

When the barley has been up three weeks or a month, it is a very good way to roll it again with a heavy roller, which will prevent the sun and air from penetrating the ground to the injury of the roots. This rolling, before it branches out, will also cause it to tiller into a greater number of stalks; so that if the plants be thin, the ground will be thereby filled, and the stalks strengthened.

If the blade grows too rank, as it sometimes will in a warm wet spring, mowing is a much better method than feeding it down with sheep; because the scythe takes off only the rank tops, but the sheep being fond of the sweet end of the stalk next the root, will often bite so close as to injure its future growth.

The county of Norfolk, according to Mr Marshall, is peculiarly adapted to the cultivation of this grain, the strongest soil not being too heavy, and the lightest being able to bear it; and so well versed are the Norfolk farmers in the cultivation of it, that the barley of this county is desired for seed throughout the whole kingdom. It is here sown after wheat or turnips, and in some very light lands it is sown after the second year's ley. After wheat, the seed time of the latter being finished, and the stubble trampled down with bullocks, the land is ploughed with a shallow furrow for a winter fallow for barley. In the beginning of March the land is harrowed and cross-ploughed; or if it be wet, the ridges are reversed. In April it receives another ploughing lengthwise; and at seed time it is harrowed, rolled, sowed, and the surface rendered as smooth and level as possible. After turnips the soil is broken up as fast as the turnips are taken off; if early in winter by *rice-balking*, a practice already explained; but if late, by a plain ploughing. It is common, if time will permit, to plough three times; the first shallow, the second full, and the third a mean depth; with which last the seed is ploughed in. Sometimes, however, the ground is ploughed only once, and the seed sown above, but more frequently by three ploughings, though, perhaps, the farmer has not above a week to perform them in. After ley, the turf is generally broken by a winter fallow, and the soil treated as after wheat.

This grain is seldom manured for, except when sown after ley, when it is treated as wheat. No manure is requisite after turnips or wheat, if the latter has been manured for. If not, the turnip crop following immediately, the barley is left to take its chance, unless the opportunity be embraced for winter marling.

Little barley is sown by the Norfolk farmers before the middle of April, and the seed time generally continues till the middle of May; though this must in some measure depend on the season; which, says Mr Marshall, is more attended to in Norfolk than perhaps in all the world besides." In the very backward spring

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Cultivation
of barley in
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spring of 1782, barley was sown in June with success. No preparation is used. It is all sown broadcast, and almost all under furrow; that is, the surface having been smoothed by the harrow and roller, the seed is sown and ploughed under with a shallow furrow; but if the season be wet, and the soil cold and heavy, it is sometimes sown above; but, if the spring be forward, and the last piece of turnips eaten off late, the ground is sometimes obliged to be ploughed only once, and to be sown above; though in this case Mr Marshall thinks it the most eligible management, instead of turning over the whole thickness of the soil, to *two-furrow* it, and sow between. This is done by only skimming the surface with the first plough, sowing the seed upon this, and then covering it with the bottom furrow brought up by the second plough. Three bushels are usually sufficient for an acre.

The barley, as well as the wheat, in Norfolk, is allowed to stand till very ripe. It is universally mown into swath, with a small bow fixed at the heel of the scythe. If it receive wet in the swath in this county, it is not turned, but *lifted*; that is, the heads or ears are raised from the ground, either with a fork or the teeth of a rake, thereby admitting the air underneath the swaths; which will not fall down again to the ground so close as before, so that the air has free access to the under side; and this method of lifting is supposed not to be inferior to that of turning, which requires more labour, besides breaking and ruffling the swaths.

²⁷⁰
In the Vale of Gloucester.

In the Vale of Gloucester the quantity of barley cultivated is very inconsiderable; the only species is the common long-eared barley, *hordeum zeocriton*. In this county the grain we speak of is used, on the every year's lands, as a cleansing crop. It is sown very late, viz. in the middle or end of May; sometimes the beginning or even the middle of June. The reason of this is, that the people of the Vale think, that if a week or ten days of fine weather can be had for the operation of harrowing out couch, and if after this a full crop of barley succeed, especially if it should fortunately take a reclining posture, the business of fallowing is effectually done, inasmuch that the soil is cleaned to a sufficient degree to last for a number of years. A great quantity of seed is made use of, viz. from three to four bushels to an acre; under the idea, that a full crop of barley, especially if it lodge, smother all kinds of weeds, couch-grass itself not excepted. Our author acknowledges this effect in some degree, but does not recommend the practice. "If the land, says he, be tolerably clean, and the season favourable, a barley fallow may no doubt be of essential service. But there is not one year in five in which even land which is tolerably clean can be sown in season, and at the same time be much benefited by it for future crops." The barley in this county is all hand-weeded. It is harvested loose, mown with the naked scythe, lies in swath, till the day of carrying, and is cocked with common hay forks. The medium produce is three quarters per acre. Its quality is preferable to that of the hill-barley.

²⁷¹
In Cotswold.

The common long-eared species is sown among the Cotswold hills. It is sown in the latter end of March and beginning of April, in the quantity of three bushels to an acre, producing from 20 bushels to four quarters

to an acre; "which, says our author, is a low produce. It must be observed, however, that this produce is from land deficient in tillage; and that barley delights in a fine pulverous tilth."

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²⁷²
In the midland district they cultivate two species of barley, viz. the *zeocriton* or common long-eared, and the *distichon* or sprat barley; the latter not being more than 50 years standing, but the former of much older date. The sprat is the more hardy, and requires to be more early sown; but the long-ear yields the better produce. It succeeds wheat and turnips; but on the strong lands of this district, the crop after wheat is much less productive, as well as less certain, than after turnips; which circumstance is likewise observed in Norfolk. It is sometimes also sown with success upon turf. When sown after wheat, the soil is winter fallowed by three ploughings; the first lengthwise in November; the second across in March; the last, which is the seed-ploughing, lengthwise. Between the two last ploughings the soil is harrowed, and the twitch shaken out with forks; after which it is left loose and light to die upon the surface, without being either burnt or carried off. After turnips the soil has commonly three ploughings; the reason of which is, that the turnips being commonly folded off with sheep, the soil, naturally of a close texture, receives a still greater degree of compactness, which it is proper to break down, to render it porous. The seed time is the two last weeks of April and the first of May; from two bushels and a half to three bushels an acre, sometimes even as much as four bushels: the produce very great, sometimes as high as seven or even eight quarters an acre; but the medium may be reckoned from four to four and a half quarters. Mr Marshall remarks, that the culture of barley is extremely difficult. "Something, says he, depends on the nature of the soil, much on the preparation, much on the season of sowing, and much on harvesting. Upon the whole, it may be deemed, of corn crops, the most difficult to be cultivated with certainty."

²⁷³
Culture of barley difficult.

²⁷⁴
In Yorkshire there are four kinds of barley cultivated, viz. the *zeocriton* or long-eared; the *distichon* or sprat; the *vulgare*, big, four-rowed or spring barley; and the *hexastichon*, six-rowed or spring barley. The first and third sorts are principally cultivated; the winter barley is as yet new to the district. Battledoor barley was formerly very common, but is now almost entirely disused. Mr Marshall observes, that less than a century ago, barley was not saleable until it was malted; there were neither maltsters nor public houses, but every farmer malted his own grain, or sold it to a neighbour who had a malt kiln. Brakes cut from the neighbouring commons were the fuel commonly used upon this occasion; and a certain day for cutting them was fixed, in order to prevent any one from taking more than his share. The case is now totally reversed, even public malt houses being unknown, and the business of malting entirely performed by maltsters, who buy the barley from the farmer, and sell him what malt he may want for his family.

In Yorkshire.

²⁷⁵
To give some idea of the importance of this grain, we shall here state the amount of the revenue which the public draws from an acre of land when cultivated for barley, independent altogether of the profits reaped from it by the landlord and tenant. Supposing an

Importance of barley to the revenue.

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acre to produce eight bolls of barley, and the whole to be made into ordinary small beer, the taxes paid by it stand thus in 1802.

| | L. | s. | d. |
|--|-------|----|----|
| 8 bolls of barley made into malt, allowing 7 bushels per boll, at 1s. 7 $\frac{3}{4}$ d. per bushel of malt duty | 4 | 12 | 2 |
| The whole may produce 40 barrels of small beer, the duty upon each of which is 2s. | 4 | 0 | 0 |
| Borough impost which is imposed in Scotland, but not in England, at 1s. 3d. per barrel | 2 | 10 | 0 |
| | L. 11 | 2 | 2 |

4. BUCK-WHEAT.

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Culture of buck-wheat.

The uses of this plant have already been sufficiently noticed. It delights in a mellow sandy soil; but succeeds well in any dry loose healthy land, and moderately so in a free loamy stone brash. A stiff clay is its aversion, and it is entirely labour lost to sow it in wet poachy ground. The proper season for sowing is from the last week of May or the beginning of June. It has been sown, however, so early as the beginning of April, and so late as the 22d of July, by way of experiment; but the latter was rather extreme to be chosen, and the former was in danger from frost. In an experiment upon a small piece of ground, the grain of two different crops was brought to maturity in the summer 1787.—After spring feedings, a crop of turnip-rooted cabbage, or vetches, there will be sufficient time to sow the land with buck-wheat. Probably, in hot dry summers, a crop of vetches might even be mown for hay early enough to introduce a crop of this grain after it.

In the year 1780, about seven acres of a sandy soil on Brislington common (F), having been first tolerably well cleaned from brambles, furze, &c. received one ploughing. To reduce the irregularities of the surface, it was rolled; and on the 9th of June in that year, two bushels and a half of buck-wheat per acre sown, the ground rolled again without harrowing.

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Advantages of this cropping.

The vegetation appeared in five or six days, as is constantly the case, be the weather wet or dry. The growth was so rapid, that the fern, with which this land greatly abounded, was completely kept under. About the middle of September the crop was mown; but by reason of a great deal of rain about that time, it was not secured until the beginning of October; hence a loss of a great part of the grain by shedding, as well as some eaten by birds. However, there were saved about 24 Winchester bushels per acre; and, notwithstanding its long exposure to the weather, received no sort of damage, only perhaps that the finest and most perfect grain was the first to fall from the plant. The ground after this had almost the appearance of a fallow, and was immediately ploughed.

When it had lain a moderate time to meliorate, and to receive the influences of the atmosphere, it was harrowed, sown with Lammas wheat, and ploughed in under furrow, in a contrary direction to the first

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ploughing. Thus a piece of land, which in the month of April was altogether in a state of nature, in the following November was seen under a promising crop of what is well styled the king of grain, and this without the aid of manure, or of any very great degree of tillage. Nor was the harvest by any means deficient; for several persons conversant in such things estimated the produce from 26 to 30 bushels per acre. As soon as the wheat crop was taken off, the ground had one ploughing, and on the first of September following was sown with turnip seed. The turnips were not large, but of an herbage so abundant as in the following spring to support 120 ewes with their lambs, which were fed on it by folding four weeks. After this it was manured with a composition of rotten dung and natural earth, about 20 putt loads per acre, and planted with potatoes. The crop sold for 138l. besides a considerable number used in the family, and a quantity reserved with which ten acres were planted the following season. The ensuing autumn it was again sown with wheat, and produced an excellent crop. In the spring of 1784, it was manured and planted with potatoes, as in the preceding instance; the crop (though tolerably good) by no means equal to the former, producing about 100 sacks per acre only. In spring 1785, the land was now for a third time under a crop of wheat, it being intended to try how far this mode of alternate cropping, one year with potatoes and another with wheat, may be carried.

From the success of the preceding and other experiments, by Nehemiah Bartley, Esq. of Bristol, as detailed in the Bath Society Papers, it would seem, that the culture of this plant ought in many cases to be adopted instead of a summer fallowing: for the crop produced appears not only to be so much clear gain in respect to such practice, but also affords a considerable quantity of straw for fodder and manure; beside that a summer fallowing is far from being so advantageous a preparation for a succeeding crop.

5. PEASE.

Pease are of two kinds; the white and the gray. ²⁷⁸ Culture of The cultivation of the latter only belongs to this place. pease.

There are two species of the gray kind, distinguished by their time of ripening. One ripens soon, and for that reason is termed *hot feed*: the other, which is slower in ripening, is termed *cold feed*.

Pease, a leguminous crop, is proper to intervene between two culmiferous crops; less for the profit of a pease crop than for meliorating the ground. Pease, however, in a dry season, will produce six or seven bolls each acre; but, in an ordinary season, they seldom reach above two, or two and a half. Hence, in a moist climate, which all the west of Britain is, red clover seems a more beneficial crop than pease; as it makes as good winter food as pease, and can be cut green thrice during summer.

A field intended for cold feed ought to be ploughed in October or November; and in February, as soon as the ground is dry, the seed ought to be sown on the winter furrow. A field intended for hot feed ought to be

(F) A very rough piece of land, at that time just enclosed.

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be ploughed in March or April, immediately before sowing. But if infested with weeds, it ought to be al-
ploughed in October or November.

Pease laid a foot below the surface will vegetate; but the most approved depth is six inches in light soil, and four inches in clay soil; for which reason, they ought to be sown under furrow when the ploughing is delayed till spring. Of all grain, beans excepted, they are the least in danger of being buried.

Pease differ from beans, in loving a dry soil and a dry season. Horse-hoeing would be a great benefit, could it be performed to any advantage; but pease grow expeditiously, and soon fall over and cover the ground, which bars ploughing. Horse-hoeing has little effect when the plants are new sprung; and when they are advanced to be benefited by that culture, their length prevents it. Fast growing at the same time is the cause of their carrying so little seed: the seed is buried among the leaves; and the sun cannot penetrate to make it grow and ripen. The only practicable remedy to obtain grain, is thin sowing; but thick sowing produces more straw, and mellow the ground more. Half a boll for an English acre may be reckoned thin sowing; three firlots thick sowing.

Notwithstanding what is said above, Mr Hunter, a noted farmer in Berwickshire, began some time ago to sow all his pease in drills; and never failed to have great crops of corn as well as of straw. He sowed double rows at a foot interval, and two feet and a half between the double rows, which admit horse-hoeing. By that method, he had also good crops of beans on light land.

Pease and beans mixed are often sown together, in order to catch different seasons. In a moist season, the beans make a good crop; in a dry season, the pease.

The growth of plants is commonly checked by drought in the month of July; but promoted by rain in August. In July, grass is parched; in August, it recovers verdure. Where pease are so far advanced in the dry season as that the seed begins to form, their growth is indeed checked, but the seed continues to fill. If only in the blossom at that season, their growth is checked a little; but they become vigorous again in August, and continue growing without stalling till stopped by frost. Hence it is, that cold seed, which is early sown, has the best chance to produce corn: hot seed, which is late sown, has the best chance to produce straw.

The following method is practised in Norfolk, for sowing pease upon a dry light soil, immediately opened from pasture. The ground is pared with a plough extremely thin, and every sod is laid exactly on its back. In every fod a double row of holes is made. A pea dropt in every hole lodges in the flay'd ground immediately below the sod, thrusts its roots horizontally, and has sufficient moisture. This method enabled Norfolk farmers, in the barren year 1740, to furnish white pease at 12s per boll.

In the Bath Papers, vol. i. p. 148. we have an account of the success of an experiment by Mr Pavier near Taunton, on sowing pease in drills. The scale on which this experiment was made, however, being so small, it would perhaps be rash to infer from it what might be the event of planting a large piece

of ground in the same manner. The space was only 16 square yards, but the produce so great, that by calculating from it, a statute acre would yield 600, or at the least 500 pecks of green pease at the first gathering; which, at the high price they bore at that time in the country about Taunton, viz. 16d. per peck, would have amounted to 33l. 6s. 8d. On this the society observe, that though they doubt not the truth of the calculation, they are of opinion, that such a quantity as 500 or 600 pecks of green pease would immediately reduce the price in any country market. "If the above-mentioned crop (say they) were sold only at nine pence per peck, the farmer would be well paid for his trouble." In a letter on the drill husbandry by Mr Whitmore, for which the thanks of the society were returned, he informs us, that drilled pease must not be sown too thin, or they will always be foul: and in an experiment of this kind, notwithstanding careful hoeing, they turned out so foul, that the produce was only eight bushels to the acre.—From an experiment related in the 3th volume of the same work, it appears that pease, however meliorating they may be to the ground at first, will at the last totally exhaust it, at the least with regard to themselves. In this experiment

they were sown on the same spot for ten years running. After the first two years the crop became gradually less and less, until at last the seed would not vegetate, but became putrid. Strawberries were then planted without any manure, and yielded an excellent crop.

On the Norfolk culture of pease, Mr Marshall makes two observations. "Leys are seldom ploughed more than once for pease; and the seed is in general dibbled in upon the flag of this one ploughing. But stubbles are in general broken by a winter-fallow of three or four ploughings; the seed being sown broadcast and ploughed in about three inches deep with the last ploughing."—In the Vale of Gloucester they are planted by women, and hoed by women and children, once, twice, and sometimes thrice; which gives the crop, when the soil is sufficiently free from root-weeds, the appearance of a garden in the summer time, and produces a plentiful crop in harvest. The distance between the rows varies from 10 to 14 inches, but 12 may be considered as the medium; the distance in the rows two inches. In the Cheltenham quarter of the district, they set the peas not in continued lines, but in clumps; making the holes eight or ten inches distant from one another, putting a number of pease in to each hole. Thus the hoe has undoubtedly greater freedom; all the disadvantage is, that in this case the soil is not so evenly and fully occupied by the roots as when they are disposed in continued lines.—In Yorkshire it is common to sow beans and gray pease together, under the name of *blendings*; and sometimes fitches (probably, says Mr Marshall, a gigantic variety of the *eryvum lens*) are sown among beans. Such mixtures are found to augment the crop, and the different species are easily separated by the sieve.

6. BEANS.

The properest soil for beans is a moist and deep clay, but they may also be raised upon all heavy soils. They are cultivated in two ways, either in the old way by broadcast, or, according to the more recent practice, they

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On setting
pease in
drills.

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Pease must
not be
sown too
often on
the same
spot.

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Mr Mar-
shall's ob-
servations.

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Culture of beans by broad-cast.

they are drilled in distinct rows. Of each of these we shall give a very short account.

When the mode of cultivating beans by broad-cast is adopted, it is to be observed, that as this grain is early sown, the ground intended for it should be ploughed before winter, to give access to the frost and air; beneficial in all soils, and necessary in a clay soil. Take the first opportunity after January, when the ground is dry, to loosen the soil with the harrow first described, till a mould be brought upon it. Sow the seed, and cover it with the second harrow. The third will smooth the surface, and cover the seed equally. These harrows make the very best figure in sowing beans: which ought to be laid deep in the ground, not less than six inches. In clay soil, the common harrows are altogether insufficient. The soil, which has rested long after ploughing, is rendered compact and solid: the common harrows skim the surface: the seed is not covered; and the first hearty shower of rain lays it above ground. Where the farmer overtakes not the ploughing after harvest, and is reduced to plough immediately before sowing, the plough answers the purpose of the first harrow; and the other two will complete the work. But the labour of the first harrow is ill saved; as the ploughing before winter is a fine preparation, not only for beans, but for grain of every kind. If the ground ploughed before winter happen by superfluity of moisture to cake, the first harrow going along the ridges, and crossing them, will loosen the surface, and give access to the air for drying. As soon as the ground is dry, sow without delaying a moment. If rain happen in the interim, there is no remedy but patience till a dry day or two come.

Carse clay, ploughed before winter, seldom fails to cake. Upon that account, a second ploughing is necessary before sowing: which ought to be performed with an ebb furrow, in order to keep the frost-mould as near the surface as possible. To cover the seed with the plough is, with regard to this as well as other grain, expressed by the phrase *to sow under furrow*. The clods raised in this ploughing are a sort of shelter to the young plants in the chilly spring months.

The foregoing method will answer for loam. And as for a sandy or gravelly soil, it is altogether improper for beans.

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Culture of beans in drills.

Previous to the year 1770, beans were seldom sown in Scotland, unless upon the very rich clays; but since that time, by adopting the plan of raising them in drills, or distinct rows, they have been successfully cultivated upon all the heavy loams, and in many farms they now constitute a regular branch of rotation. With very few exceptions, beans are constantly drilled at intervals of from 20 to 27 inches. Of these modes, the last is the most prevalent, because it admits the ground to be ploughed with a horse, in the most sufficient manner. Very little hand-hoeing is given; nor is it required, as the kind of land which is best adapted for their growth, and upon which they are commonly sown, has not naturally a tendency to the production of annual weeds, and fine crops of wheat generally follow, provided due attention has been given to working the bean crop. The necessity of summer fallow, which the present high price of labour, and the loss of a year's crop, render an expensive affair to the farmer, is consequently much lessened: for if land is once thoroughly

cleaned, and afterwards kept in an alternate course of leguminous and culmiferous crops, it will remain in good order for a considerable number of years.

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As beans delight in a moist soil, and have no end of growing in a moist season, they cover the ground totally when sown broadcast, keep in the dew, and exclude the sun and air: the plants grow to a great height; but carry little seed, and that little not well ripened. This displays the advantage of drilling; which gives free access to the sun and air, dries the ground, and affords plenty of ripe seed.

II. Plants Cultivated for Roots.

I. POTATOES.

These, next to the different kinds of grain, may be looked upon as the crop most generally useful for the husbandman; affording not only a most excellent food for cattle, but for the human species also; and they are perhaps the only substitute that could be used for bread with any probability of success. In the answer by Dr Tisset to M. Linguet already mentioned, the former objects to the constant use of them as food; not because they are pernicious to the body, but because they hurt the faculties of the mind. He owns, that those who eat maize, potatoes, or even millet, may grow tall and acquire a large size; but doubts if any such ever produced a literary work of merit. It does not, however, by any means appear, that the very general use of potatoes in our own country has at all impaired either the health of body or vigour of mind of its inhabitants. The question then, as they have already been shown to be an excellent food for cattle, comes to be merely with regard to the profit of cultivating them; and this seems already to be so well determined by innumerable experiments, as well as by the general practice of the country, that no room appears left for doubt.

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Are not prejudicial to mankind.

The choice of soil is not of greater importance in any other plant than in a potato. This plant in clay soil, or in rank black loam lying low without ventilation, never makes palatable food. In a gravelly or sandy soil, exposed to the sun and free air, it thrives to perfection, and has a good relish. But a rank black loam, though improper to raise potatoes for the table, produces them in great plenty; and the product is, as already observed, a palatable food for horned cattle, hogs, and poultry.

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General culture.

The spade is a proper instrument for raising a small quantity, or for preparing corners or other places inaccessible to the plough; but for raising potatoes in quantities, the plough is the only instrument.

As two great advantages of a drilled crop are, to destroy weeds, and to have a fallow at the same time with the crop, no judicious farmer will think of raising potatoes in any other way. In September or October, as soon as that year's crop is removed, let the field have a rousing furrow, a cross-braking next, and then be cleared of weeds by the cleaning harrow. Form it into three-foot ridges, in that state to lie till April, which is the proper time for planting potatoes. Cross-brake it, to raise the furrows a little. Then lay well digested horse-dung along the furrows, upon which lay the roots at eight inches distance. Cover up these roots with the plough, going once round every row. This makes a warm bed for the potatoes; hot dung below, and

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a loofe covering above, that admits every ray of the fun. As foon as the plants appear above ground, go round every row a fecond time with the plough, which will lay upon the plants an additional inch or two of mould, and at the fame time bury all the annuals; and this will complete the ploughing of the ridges. When the potatoes are fix inches high, the plough, with the deepeft furrow, muft go twice along the middle of each interval in oppofite directions, laying earth firft to one row, and next to the other. And to perform this work, a plough with a double mouldboard will be more expeditious. But as the earth cannot be laid clofe to the roots by the plough, the fpace muft fucceed, with which four inches of the plants muft be covered, leaving little more but the tops above ground; and this operation will at the fame time bury all the weeds that have fprung fince the former ploughing. What weeds arife after muft be pulled up with the hand. A hoe is never to be ufed here: it cannot go fo deep as to deftroy the weeds without cutting the fibres of the plants; and if it skim the furface, it only cuts off the heads of the weeds, and does not prevent their pulling again.

286 Particular methods.

In the Bath Society Papers, we have the following practical obfervations on the culture and ufe of potatoes, given as the refult of various experiments made for five years fucceffively on that valuable root, the growth of which cannot be too much encouraged.

When the potato crop has been the only object in view, the following method is the moft eligible.

The land being well pulverized by two or three good harrowings and ploughings, is then manured with 15 or 20 cart loads of dung per acre, before it receives its laft earth. Then it is thrown into what the Suffolk farmers call the *trench balk*, which is narrow and deep ridge-work, about 15 inches from the centre of one ridge to the centre of the other. Women and children drop the fets in the bottom of every furrow 15 inches apart; men follow and cover them with large hoes, a foot in width, pulling the mould down fo as to bury the fets five inches deep; they muft receive two or three hand-hoings, and be kept free from weeds; always obferving to draw the earth as much as poffible to the ftems of the young plants. By repeated trials, the firft or fecond week in April is found the moft advantageous time for planting.

In the end of September or the beginning of October, when the haulm becomes withered, they fhould be ploughed up with a ftrong double-breafed plough. The workman muft be cautioned to fet his plough very deep, that he may ftrike below all the potatoes, to avoid damaging the crop. The women who pick them up, if not carefully attended to, will leave many in the ground, which will prove detrimental to any fucceeding corn, whether wheat or barley. To avoid which inconvenience, let the land be harrowed, and turn the fwine in to glean the few that may be left by their negligence.

By this method, the fets will be 15 fquare inches from each other; it will take 18 bufhels to plant an acre; and the produce, if on a good mixed loamy foil, will amount to 300 bufhels.

If the potatoes are grown as a preparation for wheat, it is preferable to have the rows two feet two inches from each other, hand-hoeing only the fpace from plant

to plant in each row; then turning a fmall furrow from the infide of each row by a common light plough, and afterwards, with a double breafed plough with one horfe, fplit the ridge formed by the firft ploughing thoroughly to clean the intervals. This work fhould not be done too deep the firft time, to avoid burying the tender plants; but the laft earth fhould be ploughed as deep as poffible; and the clofer the mould is thrown to the ftems of the plants, the more advantageous it will prove. Thus 15 bufhels will plant an acre, and the produce will be about 300 bufhels; but the land, by the fummer ploughings, will be prepared to receive feed wheat immediately, and almoft ensure a plentiful crop.

The potato fets fhould be cut a week before planting, with one or two eyes to each, and the pieces not very fmall; two bufhels of frefh-flaked lime fhould be fown over the furface of the land as foon as planted, which will effectually prevent the attacks of the grub.

287 To prevent the grub.

The expence attending an acre of potatoes well cultivated in the firft method, fuppofing the rent 20 fhillings, tithe and town charges rather high (as in Suffolk), taking up, and every thing included, will be about fix punds. In the laft method, it would be fomewhat reduced.

“When predilections for old cuftoms are fubdued (adds the author), I hope to fee the potato admitted in the conftant courfe of crops by every fpirited husbandman. The moft beneficial effects will, I am certain, accrue from fuch a fyftem. The advantages in my neighbourhood are apparent; I cultivated and fed my own children upon them, and my poorer neighbours fenfibly followed the example. A great proportion of every cottager’s garden is now occupied by this root, and it forms a principal part of their diet. Potatoes are cheap and excellent fubftitutes for peafe in foups and broths, allowing double the quantity.

“Although it is nearly a tranfcript of the directions given by a very ingenious author, yet I fhall take the liberty of inferting a receipt for making a potato-foup, which I have weekly diftributed among the poor to their great relief.

288 A cheap preparation for the poor.

| | |
|-----------------------------------|-------|
| | s. d. |
| An ox’s head | 2 9 |
| Two pecks of potatoes | 0 6 |
| Quarter of a peck of onions | 0 3 |
| Three quarters of a pound of falt | 0 1 |
| An ounce and a half of pepper | 0 3 |

Total 3 10

Ninety pints of water to be boiled with the above ingredients on a flow fire until reduced to 60, which require one peck of coals, value threepence. I have added the expence of every article according to their prices with me, that gentlemen may clearly perceive at how eafy a rate they can feed 60 of their poor neighbours. I find from experience, a pint of this foup, with a fmall piece of the meat, is fufficient to fatisfy a hearty working man with a good meal. If vegetables are plentiful, fome of every fort may be added, with a few fweet herbs.

“I hope my inferting the above will not be efteemed improper; though fomewhat deviating from the culture of potatoes, it may poffibly be a means of rendering them more extenfively ufed.”

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Methods of
cultivating
potatoes on
small spots.

A premium having been offered by the above-mentioned society for the cultivation of potatoes by farmers, &c. whose rent does not exceed 40*l. per annum*, the following methods were communicated, by which those who have only a small spot of ground may obtain a plentiful crop.

First, then, the earth should be dug 12 inches deep, if the soil will allow of it; after this, a hole should be opened about 6 inches deep, horse dung or long litter should be put therein about 3 inches thick; this hole should not be more than 12 inches in diameter; upon this dung or litter a potato should be planted whole, upon which a little more dung should be cast, and then earth must be put thereon. In like manner the whole plot of ground must be planted, taking care that each potato be at least 16 inches apart; and when the young shoots make their appearance, they should have fresh mould drawn round them with a hoe; and if the tender shoots are covered, it will prevent the frost from injuring them: they should again be earthed when the shoots make a second appearance, but not be covered, as in all probability the season will then be less severe. A plentiful supply of mould should be given them, and the person who performs this business should never tread upon the plant, or the hillock that is raised round it; as the lighter the earth is, the more room the potato will have to expand. From a single root thus planted, very near 40 pounds weight of large potatoes were obtained, and from almost every other root upon the same plot of ground from 15 or 20 pounds weight; and except the soil be stoney or gravelly, 10 pounds or half a peck of potatoes may almost always be obtained from each root, by pursuing the foregoing method. But note, cuttings or small sets will not do for this purpose.

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Methods of
culture adapted to
small farms.

The second method will suit the indolent, or those who have not time to dig their ground; and that is, where weeds much abound and have not been cleared in the winter, a trench may be opened in a straight line the whole length of the ground, and about 6 inches deep: in this trench the potatoes should be planted about ten inches apart; cuttings or small potatoes will do for this method. When they are laid in the trench, the weeds that are on the surface may be pared off on each side about ten inches from it, and be turned upon the plants; another trench should then be dug, and the mould that comes out of it turned carefully on the weeds. It must not be forgot, that each trench should be regularly dug, that the potatoes may be throughout the plot 10 or 12 inches from each other. This slovenly method will in general raise more potatoes than can be produced by digging the ground twice, and dibbling in the plants; and the reason is, that the weeds lighten the soil, and give the roots room to expand. They should be twice hoed, and earthed up in rows. And here note, that if cut potatoes are to be planted, every cutting should have two eyes, for though fewer sets will be obtained, there will be a greater certainty of a crop, as one eye often fails or is destroyed by grubs in the earth.

Where a crop of potatoes fails in part (as will sometimes be the case in a dry season), amends may still be made by laying a little dung upon the knots of the straw or haulm of those potatoes that do appear, and covering them with mould: each knot or joint thus

ordered will, if the weather prove wet afterwards, produce more potatoes than the original roots.

From the smallest potatoes planted whole, from four to six pounds at a root were obtained, and some of the single potatoes weighed near two pounds. These were dug in as before mentioned, in trenches where the ground was covered with weeds, and the soil was a stiff loamy clay.

A good crop may be obtained by laying potatoes upon turf at about 12 or 14 inches apart, and upon beds of about six feet wide; on each side of which a trench should be opened about three feet wide, and the turf that comes from thence should be laid with the grassy side downwards upon the potatoes; a spit of mould should next be taken from the trenches, and be spread over the turf; and in like manner the whole plot of ground that is designed to be planted must be treated. And remark, that when the young shoots appear, another spit of mould from the trenches should be strewn over the beds so as to cover the shoots; this will prevent the frost from injuring them, encourage them to expand, and totally destroy the young weeds; and when the potatoes are taken up in the autumn, a careful person may turn the earth again into the trenches, so as to make the surface level; and it will be right to remark, that from the same ground a much better crop of potatoes may be obtained the following year.

For field planting, a good (if not the best) method is to dung the land, which should be once ploughed previous thereto; and when it is ploughed a second time, a careful person should drop the potato plants before the plough in every third furrow at about eight or ten inches apart. Plants that are cut with two eyes are best for this purpose. The reason for planting them at so great a distance as every third furrow, is, that when the shoots appear, a horse-hoe may go upon the two vacant furrows to keep them clean; and after they are thus hoed, they should be moulded up in ridges; and if this crop be taken up about October or November, the land will be in excellent condition to receive a crop of wheat. Lands that are full of twitch or couch-grass may be made clean by this method, as the horse-hoeing is as good as a summer fallow; and if, when the potatoes are taken up, women and children were to pick out such filth, not any traces of it would remain; and by laying it on heaps and burning it, a quantity of ashes would be produced for manure.

After ploughing, none should ever dibble in potatoes, as the persons who dibble, plant, or hoe them, will all tread the ground; by which means it will become so bound, that the young fibres cannot expand, as has been already observed. Good crops have indeed been obtained by ploughing the land twice, and dropping the plants in every other furrow, and by hand-hoeing and earthing them up afterwards as the gardeners do pease; but this method is not equal to the other.

Vacant places in hedge-rows might be grubbed and planted with potatoes, and a good crop might be expected, as the leaves of trees, thorns, &c. are a good manure, and will surprisingly encourage their growth, and gratify the wishes of the planter; who by cultivating such places, will then make the most of his ground, and it will be in fine order to receive a crop of corn the following year.

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